

PROBLEM SUMMARY

Sample Rating Trend

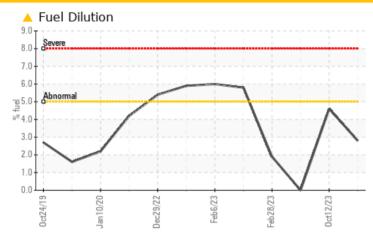
FUEL

Machine Id **927080-260332**

Component **Diesel Engine**

PETRO CANADA DURON SHP 15W40 (--- GAL)

COMPONENT CONDITION SUMMARY



RECOMMENDATION

No corrective action is recommended at this time. Resample at the next service interval to monitor.

PROBLEMATIC TEST RESULTS								
Sample Status				MARGINAL	ABNORMAL	ABNORMAL		
Fuel	%	ASTM D3524	>5	2.8	△ 4.6	<1.0		

Customer Id: GFL822 Sample No.: GFL0098349 Lab Number: 06030199 Test Package: FLEET



To manage this report scan the QR code

To discuss the diagnosis or test data: Wes Davis +1 905-569-8600 x223 wesd@wearcheck.ca

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

12 Oct 2023 Diag: Jonathan Hester

GLYCOL



We advise that you check for the source of the coolant leak. Check for low coolant level. We advise that you check the fuel injection system. 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. There is a moderate amount of fuel present in the oil. Fuel is present in the oil and is lowering the viscosity. The BN result indicates that there is suitable alkalinity remaining in the oil.



28 Aug 2023 Diag: Jonathan Hester

GLYCOL



We advise that you check for the source of the coolant leak. Check for low coolant level. We recommend an early resample to monitor this condition. All component wear rates are normal. Sodium and/or potassium levels remain high. The BN result indicates that there is suitable alkalinity remaining in the oil.



31 Jul 2023 Diag: Jonathan Hester

GLYCOL



We advise that you check for the source of the 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. There is a high concentration of glycol present in the oil. The BN result indicates that there is suitable alkalinity remaining in the oil. The oil is no longer serviceable due to the presence of contaminants.





OIL ANALYSIS REPORT

Sample Rating Trend



Machine Id **927080-260332**

Component

Diesel Engine

PETRO CANADA DURON SHP 15W40 (--- G

DIAGNOSIS

Recommendation

No corrective action is recommended at this time. Resample at the next service interval to monitor.

All component wear rates are normal.

Contamination

Light fuel dilution occurring. No other contaminants were detected in the oil.

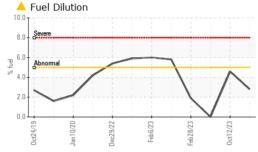
Fluid Condition

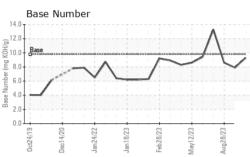
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

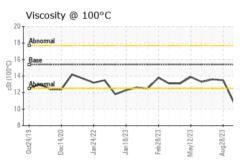
Sample Date	iAL)		ct2019 De	2020 Jan2022 Jan2	023 Feb2023 May2023 A	ug2023	
Sample Date	SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Machine Age hrs Client Info 15941 15564 15277 Oil Age hrs Client Info 700 700 150 Oil Changed Client Info Not Changed Not Changed Not Changed Not Changed Not Changed ABNORMAL	Sample Number		Client Info		GFL0098349	GFL0079301	GFL0079309
Oil Age hrs Client Info 700 700 150 Oil Changed Client Info Not Changed Not Chang	Sample Date		Client Info		05 Dec 2023	12 Oct 2023	28 Aug 2023
Colient Info	Machine Age	hrs	Client Info		15941	15564	15277
MARGINAL ABNORMAL ABNORMAL CONTAMINATION method limit/base current history1 history2	Oil Age	hrs	Client Info		700	700	150
CONTAMINATION method limit/base current history1 history2 Water WC Method NEG NEG NEG Glycol WC Method NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >100 22 18 11 Chromium ppm ASTM D5185m >20 <1	Oil Changed		Client Info		Not Changd	Changed	Not Changd
Water WC Method >0.2 NEG NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >100 22 18 11 Chromium ppm ASTM D5185m >20 <1 1 <1 Nickel ppm ASTM D5185m >4 0 <1 0 Silver ppm ASTM D5185m >4 0 <1 0 Silver ppm ASTM D5185m >3 0 0 0 Silver ppm ASTM D5185m >40 0 0 <1 Copper ppm ASTM D5185m >40 0 0 <1 Copper ppm ASTM D5185m >33 <1 58 5 Tin ppm ASTM D5185m >15 0 0 <1 Vanadium ppm ASTM D5185m 0 0 25	Sample Status				MARGINAL	ABNORMAL	ABNORMAL
WEAR METALS	CONTAMINATI	ON	method	limit/base	current	history1	history2
WEAR METALS	Water		WC Method	>0.2	NEG	NEG	NEG
Iron	Glycol		WC Method		NEG	NEG	NEG
Chromium	WEAR METALS	S	method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>100	22	18	11
Titanium	Chromium	• •	ASTM D5185m	>20	<1	1	<1
Silver	Nickel		ASTM D5185m	>4	0	<1	0
Aluminum ppm ASTM D5185m >20 2 2 4 Lead ppm ASTM D5185m >40 0 0 <1 Copper ppm ASTM D5185m >330 <1 58 5 Tin ppm ASTM D5185m >15 0 0 <1 Vanadium ppm ASTM D5185m 0 0 0 <1 Cadmium ppm ASTM D5185m 0 0 0 <1 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 25 0 Barium ppm ASTM D5185m 0 0 2 0 Boron ppm ASTM D5185m 0 0 2 0 Boron ppm ASTM D5185m 0 0 2 0 Barium ppm ASTM D5185m 0 0 1 7	Titanium	ppm	ASTM D5185m		0	0	0
Aluminum ppm ASTM D5185m >20 2 2 4 Lead ppm ASTM D5185m >40 0 0 <1 Copper ppm ASTM D5185m >330 <1 58 5 Tin ppm ASTM D5185m >15 0 0 <1 Vanadium ppm ASTM D5185m 0 0 0 <1 Cadmium ppm ASTM D5185m 0 0 0 <1 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 25 0 Barium ppm ASTM D5185m 0 0 2 0 Molybdenum ppm ASTM D5185m 0 41 <1 <1 Manganese ppm ASTM D5185m 0 41 <1 <1 <1 Galcium ppm ASTM D5185m 1070 995	Silver		ASTM D5185m	>3	0		0
Copper ppm ASTM D5185m >330 <1 58 5 Tin ppm ASTM D5185m >15 0 0 <1	Aluminum	ppm	ASTM D5185m	>20	2	2	4
Tin	Lead	ppm	ASTM D5185m	>40	0	0	<1
Vanadium ppm ASTM D5185m 0 0 <1 Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 25 0 Barium ppm ASTM D5185m 0 0 2 0 Molybdenum ppm ASTM D5185m 0 <1 <1 <1 Manganese ppm ASTM D5185m 0 <1 <1 <1 <1 Magnesium ppm ASTM D5185m 1070 995 1175 1139 Phosphorus ppm ASTM D5185m 1270 1209 862 1333 Sulfur ppm ASTM D5185m 1270 1209 862 1333 Sulfur ppm ASTM D5185m 2060 2954 2963 3705 CONTAMINANTS method limit/base current <th< td=""><td>Copper</td><td>ppm</td><td>ASTM D5185m</td><td>>330</td><td><1</td><td>58</td><td>5</td></th<>	Copper	ppm	ASTM D5185m	>330	<1	58	5
Vanadium ppm ASTM D5185m 0 0 <1 Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 25 0 Barium ppm ASTM D5185m 0 0 2 0 Molybdenum ppm ASTM D5185m 0 0 2 0 Manganese ppm ASTM D5185m 0 <1 <1 <1 Magnesium ppm ASTM D5185m 1010 931 747 1023 Calcium ppm ASTM D5185m 1070 995 1175 1139 Phosphorus ppm ASTM D5185m 1270 1209 862 1333 Sulfur ppm ASTM D5185m 2060 2954 2963 3705 CONTAMINANTS method limit/base current history1	• •				0	0	<1
ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 25 0 Barium ppm ASTM D5185m 0 0 2 0 Molybdenum ppm ASTM D5185m 60 56 25 79 Manganese ppm ASTM D5185m 0 <1	Vanadium	• •	ASTM D5185m		0	0	<1
Boron ppm ASTM D5185m 0 0 25 0 Barium ppm ASTM D5185m 0 0 2 0 Molybdenum ppm ASTM D5185m 0 56 25 79 Manganese ppm ASTM D5185m 0 <1 <1 <1 Magnesium ppm ASTM D5185m 1010 931 747 1023 Calcium ppm ASTM D5185m 1070 995 1175 1139 Phosphorus ppm ASTM D5185m 1150 968 708 1062 Zinc ppm ASTM D5185m 1270 1209 862 1333 Sulfur ppm ASTM D5185m >2060 2954 2963 3705 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 6 6 8 Sodium ppm ASTM D5185m >20	Cadmium	ppm	ASTM D5185m		0	0	0
Barium ppm ASTM D5185m 0 0 2 0 Molybdenum ppm ASTM D5185m 60 56 25 79 Manganese ppm ASTM D5185m 0 <1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 60 56 25 79 Manganese ppm ASTM D5185m 0 <1 <1 <1 Magnesium ppm ASTM D5185m 1010 931 747 1023 Calcium ppm ASTM D5185m 1070 995 1175 1139 Phosphorus ppm ASTM D5185m 1150 968 708 1062 Zinc ppm ASTM D5185m 1270 1209 862 1333 Sulfur ppm ASTM D5185m 2060 2954 2963 3705 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 6 6 8 Sodium ppm ASTM D5185m >20 0 75 33 Fuel % ASTM D5185m >20 0 75 33 Fuel % ASTM D7844 >3 </td <td>Boron</td> <td>ppm</td> <td>ASTM D5185m</td> <td>0</td> <td>0</td> <td>25</td> <td>0</td>	Boron	ppm	ASTM D5185m	0	0	25	0
Manganese ppm ASTM D5185m 0 <1 <1 <1 Magnesium ppm ASTM D5185m 1010 931 747 1023 Calcium ppm ASTM D5185m 1070 995 1175 1139 Phosphorus ppm ASTM D5185m 1150 968 708 1062 Zinc ppm ASTM D5185m 1270 1209 862 1333 Sulfur ppm ASTM D5185m 2060 2954 2963 3705 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m 225 6 6 8 Sodium ppm ASTM D5185m >20 0 75 33 Fuel % ASTM D5185m >20 0 75 33 Fuel % ASTM D5185m >20 0 75 33 Fuel % ASTM D5185m >20	Barium	ppm	ASTM D5185m	0	0	2	0
Magnesium ppm ASTM D5185m 1010 931 747 1023 Calcium ppm ASTM D5185m 1070 995 1175 1139 Phosphorus ppm ASTM D5185m 1150 968 708 1062 Zinc ppm ASTM D5185m 1270 1209 862 1333 Sulfur ppm ASTM D5185m 2060 2954 2963 3705 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 6 6 8 Sodium ppm ASTM D5185m >20 0 75 33 Fuel % ASTM D3524 >5 2.8 4.6 <1.0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 1.3 0.7 0.3 Nitration Abs/cm *ASTM D741	Molybdenum	ppm	ASTM D5185m	60	56	25	79
Calcium ppm ASTM D5185m 1070 995 1175 1139 Phosphorus ppm ASTM D5185m 1150 968 708 1062 Zinc ppm ASTM D5185m 1270 1209 862 1333 Sulfur ppm ASTM D5185m 2060 2954 2963 3705 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 6 6 8 Sodium ppm ASTM D5185m >20 0 75 △ 33 Fuel % ASTM D5185m >20 0 △ 75 △ 33 Fuel % ASTM D5185m >20 0 △ 75 △ 33 Fuel % ASTM D5185m >20 0 △ 75 △ 33 Soot % % *ASTM D7844 >3 </td <td>Manganese</td> <td>ppm</td> <td>ASTM D5185m</td> <td>0</td> <td><1</td> <td><1</td> <td><1</td>	Manganese	ppm	ASTM D5185m	0	<1	<1	<1
Phosphorus ppm ASTM D5185m 1150 968 708 1062 Zinc ppm ASTM D5185m 1270 1209 862 1333 Sulfur ppm ASTM D5185m 2060 2954 2963 3705 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 6 6 8 Sodium ppm ASTM D5185m >20 0 75 33 Footassium ppm ASTM D5185m >20 0 75 33 Fuel % ASTM D3524 >5 2.8 4.6 <1.0	Magnesium	ppm	ASTM D5185m	1010	931	747	1023
Zinc ppm ASTM D5185m 1270 1209 862 1333 Sulfur ppm ASTM D5185m 2060 2954 2963 3705 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 6 6 8 Sodium ppm ASTM D5185m 3 A 78 A 176 Potassium ppm ASTM D5185m >20 0 A 75 A 33 Fuel % ASTM D3524 >5 A 2.8 A 4.6 <1.0	Calcium	ppm	ASTM D5185m	1070	995	1175	1139
Sulfur ppm ASTM D5185m 2060 2954 2963 3705 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 6 6 8 Sodium ppm ASTM D5185m 3 78 176 Potassium ppm ASTM D5185m >20 0 75 33 Fuel % ASTM D3524 >5 2.8 4.6 <1.0	Phosphorus	ppm	ASTM D5185m	1150	968	708	1062
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 6 6 8 Sodium ppm ASTM D5185m 3 A 78 A 176 Potassium ppm ASTM D5185m >20 0 A 75 A 33 Fuel % ASTM D3524 >5 A 2.8 A 4.6 <1.0	Zinc	ppm	ASTM D5185m	1270	1209	862	1333
Silicon ppm ASTM D5185m >25 6 6 8 Sodium ppm ASTM D5185m 3 78 176 Potassium ppm ASTM D5185m >20 0 75 33 Fuel % ASTM D3524 >5 2.8 4.6 <1.0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 1.3 0.7 0.3 Nitration Abs/cm *ASTM D7624 >20 9.7 10.3 8.1 Sulfation Abs/.1mm *ASTM D7415 >30 21.3 20.3 19.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.3 15.3 14.9	Sulfur	ppm	ASTM D5185m	2060	2954	2963	3705
Sodium ppm ASTM D5185m 3 4 78 4 176 Potassium ppm ASTM D5185m >20 0 75 33 Fuel % ASTM D3524 >5 4 2.8 4.6 <1.0	CONTAMINAN	TS	method	limit/base	current	history1	history2
Potassium ppm ASTM D5185m >20 0 ▲ 75 ▲ 33 Fuel % ASTM D3524 >5 ▲ 2.8 ▲ 4.6 <1.0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 1.3 0.7 0.3 Nitration Abs/cm *ASTM D7624 >20 9.7 10.3 8.1 Sulfation Abs/.1mm *ASTM D7415 >30 21.3 20.3 19.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.3 15.3 14.9	Silicon	ppm	ASTM D5185m	>25	6	6	8
Fuel % ASTM D3524 >5 ▲ 2.8 ▲ 4.6 <1.0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 1.3 0.7 0.3 Nitration Abs/cm *ASTM D7624 >20 9.7 10.3 8.1 Sulfation Abs/.1mm *ASTM D7415 >30 21.3 20.3 19.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.3 15.3 14.9	Sodium	ppm	ASTM D5185m		3	<u>^</u> 78	△ 176
INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 1.3 0.7 0.3 Nitration Abs/cm *ASTM D7624 >20 9.7 10.3 8.1 Sulfation Abs/.1mm *ASTM D7415 >30 21.3 20.3 19.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.3 15.3 14.9	Potassium	ppm	ASTM D5185m	>20	0	<u>^</u> 75	△ 33
Soot % % *ASTM D7844 >3 1.3 0.7 0.3 Nitration Abs/cm *ASTM D7624 >20 9.7 10.3 8.1 Sulfation Abs/.1mm *ASTM D7415 >30 21.3 20.3 19.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.3 15.3 14.9	Fuel	%	ASTM D3524	>5	<u>^</u> 2.8	△ 4.6	<1.0
Nitration Abs/cm *ASTM D7624 >20 9.7 10.3 8.1 Sulfation Abs/.1mm *ASTM D7415 >30 21.3 20.3 19.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.3 15.3 14.9	INFRA-RED		method	limit/base	current	history1	history2
Nitration Abs/cm *ASTM D7624 > 20 9.7 10.3 8.1 Sulfation Abs/.1mm *ASTM D7415 > 30 21.3 20.3 19.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 > 25 16.3 15.3 14.9	Soot %	%	*ASTM D7844	>3	1.3	0.7	0.3
Sulfation Abs/.1mm *ASTM D7415 >30 21.3 20.3 19.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.3 15.3 14.9	Nitration	Abs/cm	*ASTM D7624	>20		10.3	
Oxidation Abs/.1mm *ASTM D7414 >25 16.3 15.3 14.9	Sulfation	Abs/.1mm	*ASTM D7415	>30		20.3	
	FLUID DEGRAD	ATION	method	limit/base	current	history1	history2
Base Number (BN) mg KOH/g ASTM D2896 9.8 9.3 7.9 8.6	Oxidation	Abs/.1mm	*ASTM D7414	>25	16.3	15.3	14.9
	Base Number (BN)	mg KOH/g	ASTM D2896	9.8	9.3	7.9	8.6



OIL ANALYSIS REPORT



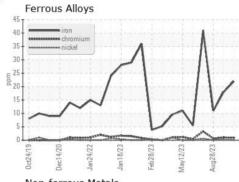


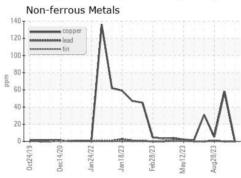


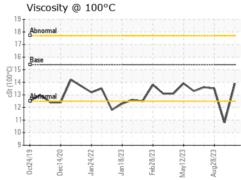
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML	NORML
Emulsified Water	scalar	*Visual	>0.2	NEG	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG

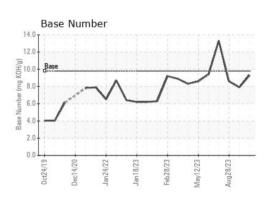
FLUID PROP	ERHES	method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445	15.4	13.9	▲ 10.8	13.5

GRAPHS













Laboratory Sample No. Lab Number **Unique Number**

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : GFL0098349 : 06030199

Recieved : 10779990

Diagnosed

: 18 Dec 2023 Diagnostician : Wes Davis

: 11 Dec 2023

Test Package : FLEET (Additional Tests: PercentFuel) 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)

GFL Environmental - 822 - Springfield Hauling

2120 West Bennett Street Springfield, MO US 65807

Contact: Dennis Moore dennis.moore@gflenv.com T: (417)403-3641