

### RECOMMENDATION

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.

PROBLEMATI	C TES	T RESULT	S			
Sample Status				SEVERE	NORMAL	NORMAL
Fuel	%	ASTM D3524	>5	🛑 13.2	<1.0	<1.0
Visc @ 100°C	cSt	ASTM D445	15.4	<u> </u>	14.1	14.9

Customer Id: GFL415 Sample No.: GFL0064040 Lab Number: 05739186 Test Package: FLEET



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*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								
Action	Status	Date	Done By	Description				
Change Fluid			?	Oil and filter change at the time of sampling has been noted.				
Change Filter			?	Oil and filter change at the time of sampling has been noted.				
Resample			?	We recommend an early resample to monitor this condition.				
Check Fuel/injector System			?	We advise that you check the fuel injection system.				

## HISTORICAL DIAGNOSIS



11 Oct 2022 Diag: Jonathan Hester

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.





## 07 Mar 2022 Diag: Wes Davis

NORMAL



Resample at the next service interval to monitor. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample.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.



#### 14 Dec 2021 Diag: Don Baldridge

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.







# **OIL ANALYSIS REPORT**

Sample Rating Trend



Machine Id 4511M

Component **Diesel Engine** Fluid

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

DIAGNOSIS	SAMPLE INFO	RMATION	method	limit/base current	history1	history2
Recommendation	Sample Number		Client Info	GFL0064040		GFL0047603
We advise that you check the fuel injection system.	Sample Date		Client Info	12 Jan 2023		07 Mar 2022
Oil and filter change at the time of sampling has	Machine Age	hrs	Client Info	1739	23280	23245
been noted. We recommend an early resample to	Oil Age	hrs	Client Info	0	23245	22643
monitor this condition.	Oil Changed	1110	Client Info	Changed	Changed	Changed
Wear All component wear rates are normal.	Sample Status			SEVERE	NORMAL	NORMAL
Contamination	CONTAMINA	TION	method	limit/base current	history1	history2
There is a high amount of fuel present in the oil.	Glycol		WC Method	NEG	NEG	NEG
	WEAR META	LS	method	limit/base current	history1	history2
Fuel is present in the oil and is lowering the viscosity. The BN result indicates that there is	Iron	ppm	ASTM D5185m	>90 38	60	61
suitable alkalinity remaining in the oil. The oil is no	Chromium	ppm	ASTM D5185m		3	3
onger serviceable due to the presence of	Nickel	ppm	ASTM D5185m		0	0
contaminants.	Titanium	ppm	ASTM D5185m		0	0
	Silver	ppm	ASTM D5185m		0	0
	Aluminum	ppm	ASTM D5185m	-	14	6
	Lead	ppm	ASTM D5185m		9	<1
	Copper	ppm	ASTM D5185m		2	1
	Tin		ASTM D5185m		1	0
	Antimony	ppm	ASTM D5185m			0
	Vanadium	ppm	ASTM D5185m			0
		ppm		0	0	
	Cadmium	ppm	ASTM D5185m	0	0	0
	ADDITIVES		method	limit/base current	history1	history2
	Boron	ppm	ASTM D5185m	0 2	0	
	Doron	ppm		0 2	3	3
	Barium	ppm	ASTM D5185m		2	3 0
				0 0		
	Barium Molybdenum Manganese	ppm	ASTM D5185m	0 0 60 <b>52</b>	2	0
	Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m	0 0 60 52 0 <1	2 58	0 61
	Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	0         0           60         52           0         <1	2 58 <1	0 61 <1
	Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0         0           60         52           0         <1	2 58 <1 817	0 61 <1 1054
	Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0         0           60         52           0         <1	2 58 <1 817 1029	0 61 <1 1054 1186
	Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0         0           60         52           0         <1           1010         779           1070         910           1150         815           1270         967	2 58 <1 817 1029 927	0 61 <1 1054 1186 1096
	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0         0           60         52           0         <1	2 58 <1 817 1029 927 1167	0 61 <1 1054 1186 1096 1273
	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b> ASTM D5185m	0 0 60 52 0 <1 1010 779 1070 910 1150 815 1270 967 2060 2778 limit/base current >25 11	2 58 <1 817 1029 927 1167 2999 history1 7	0 61 <1 1054 1186 1096 1273 2651 history2 10
	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINA Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b> ASTM D5185m ASTM D5185m	0 0 60 52 0 <1 1010 779 1070 910 1150 815 1270 967 2060 2778 limit/base current >25 11 7	2 58 <1 817 1029 927 1167 2999 history1 7 4	0 61 <1 1054 1186 1096 1273 2651 history2
	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINA Silicon	ppm ppm ppm ppm ppm ppm ppm ppm NTS	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0         0           60         52           0         <1	2 58 <1 817 1029 927 1167 2999 history1 7 4 29	0 61 <1 1054 1186 1096 1273 2651 history2 10
	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINA Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b> ASTM D5185m ASTM D5185m	0         0           60         52           0         <1	2 58 <1 817 1029 927 1167 2999 history1 7 4	0 61 <1 1054 1186 1096 1273 2651 history2 10 6
	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINA Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0         0           60         52           0         <1	2 58 <1 817 1029 927 1167 2999 history1 7 4 29	0 61 <1 1054 1186 1096 1273 2651 history2 10 6 1 1 <1.0
	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINA Silicon Sodium Potassium Fuel	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	0     0       60     52       0     <1	2 58 <1 817 1029 927 1167 2999 history1 7 4 29 <1.0	0 61 <1 1054 1186 1096 1273 2651 history2 10 6 1 1 <1.0
	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINA Silicon Sodium Potassium Fuel INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	0     0       60     52       0     <1	<ul> <li>2</li> <li>58</li> <li>&lt;1</li> <li>817</li> <li>1029</li> <li>927</li> <li>1167</li> <li>2999</li> <li>history1</li> <li>7</li> <li>4</li> <li>29</li> <li>&lt;1.0</li> <li>history1</li> </ul>	0 61 <1 1054 1186 1096 1273 2651 history2 10 6 1 1 <1.0 history2
	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINA Silicon Sodium Potassium Fuel INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	0         0           60         52           0         <1	<ul> <li>2</li> <li>58</li> <li>&lt;1</li> <li>817</li> <li>1029</li> <li>927</li> <li>1167</li> <li>2999</li> <li>history1</li> <li>7</li> <li>4</li> <li>29</li> <li>&lt;1.0</li> <li>history1</li> <li>3.8</li> </ul>	0 61 <1054 1186 1096 1273 2651 history2 10 6 1 1 <1.0 kistory2 2.3
	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINA Silicon Sodium Potassium Fuel INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	0         0           60         52           0         <1	<ul> <li>2</li> <li>58</li> <li>&lt;1</li> <li>817</li> <li>1029</li> <li>927</li> <li>1167</li> <li>2999</li> <li>history1</li> <li>7</li> <li>4</li> <li>29</li> <li>&lt;1.0</li> <li>history1</li> <li>3.8</li> <li>15.9</li> </ul>	0 61 <1 1054 1186 1096 1273 2651 history2 10 6 1 1 <1.0 kistory2 2.3 13.3
	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINA Silicon Sodium Potassium Fuel INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	0         0           60         52           0         <1	<ul> <li>2</li> <li>58</li> <li>&lt;1</li> <li>817</li> <li>1029</li> <li>927</li> <li>1167</li> <li>2999</li> <li>history1</li> <li>7</li> <li>4</li> <li>29</li> <li>&lt;1.0</li> <li>history1</li> <li>3.8</li> <li>15.9</li> <li>31.3</li> </ul>	0 61 <1 1054 1186 1096 1273 2651 history2 10 6 1 <1.0 kistory2 2.3 13.3 26.0

Base Number (BN) mg KOH/g ASTM D2896 9.8

7.4

8.8

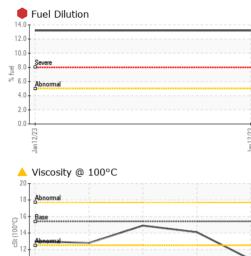
6.2

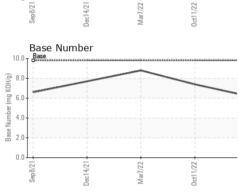


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# **OIL ANALYSIS REPORT**





	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
12/23	Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
<u>.</u>	0001	scalar	*Visual	NORML	NORML	NORML	NORML
	Emulsified Water	scalar	*Visual	>0.2	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	15.4	<mark>▲</mark> 10.8	14.1	14.9
	GRAPHS						
	Ferrous Alloys						
22	70- iron		   				
Mar1/22 0ct11/22	60 - nickel	<u> </u>	_				
-	50 -						
	톮 40		· · · · · · · · · · · · · · · · · · ·				
	30 -						
	20 -						
	10-						
		22	2	2			
	Sep 8/21 Dec1 4/21	Mar7/22	0ct11/22	Jan 12/23			
			ŏ	P			
22	Non-ferrous Meta	IIS	·				
Mar1/22 0ct11/22	copper		۸				
~	8 - tin		/\				
	6-		$/ \land$				
	Md .		$/   \rangle$				
	4	1	1				
	2-	1	~	1			
	SECONDECTOR OF THE REAL PROPERTY OF THE REAL PROPER	1		+			
	Contraction in the local division in the loc	N	2+				
	27	2	12	/23			
	Sep 8/21	Mar7/22	0ct11/22	Jan 12/23			
	Viscosity @ 100°		0ct11/2	Jan 12/23	Base Number		
	Viscosity @ 100°		0ct11/2		Base Number		
	Viscosity @ 100°		0ct11/2	10.	Base	~	
	Viscosity @ 100°		0ct11/2	10.	Base		
	Viscosity @ 100°		Oct11/2	10.	D T Base		
	Viscosity @ 100°		Oct11/2	10.	0 - <u>Base</u> 0		
	Viscosity @ 100°		Oct112	10.	0 - <u>Base</u> 0		
	Viscosity @ 100° Abnormal Abnormal Abnormal Abnormal Abnormal Abnormal Abnormal Abnormal		Oct112	10.1 (6) HOX (8) (6) HOX (6) (6) (9) (9) (9) (9) (9) (9) (9) (9) (9) (9	D - Base		
	Viscosity @ 100° Abnormal Abnormal Base Control 14 Base Control 14 Base Control 14 Control 14		Oct112	10.1 (0)(0)(0)(0)(0)(0)(0)(0)(0)(0)(0)(0)(0)(	D - Base		
	Viscosity @ 100° Abnormal Abnormal Base Control 14 Base Control 14 Control 14 Cont	с 	~	10.1 8.4 0.004(0) 1.4 9888 Winner 1.2 8386 Winner 1.2 8386 Winner 1.2 8386 Winner 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	D + Base	1/22	122
	Viscosity @ 100° Abnormal Abnormal Abnormal Abnormal Abnormal Abnormal Abnormal Abnormal		0ct11/22 0ct11/2	10.1 (0)(0)(0)(0)(0)(0)(0)(0)(0)(0)(0)(0)(0)(	D - Base	Mari/22	0ct11/22
	Viscosity @ 100° Viscosity @ 100° Abnormal	C	0et1/22 -	10.1 (0.10) Base Number (mg Kolfic) 2.1 0.1 0.1 0.1	Base Sep0321 Dec14/21		
Laboratory	Viscosity @ 100° Viscosity @ 100° Abnomal Abnomal 10 10 10 10 10 10 10 10 10 10	C 	son Ave., Ca	10.1 (0)HOX bul) Ja (0)HOX bul) Ja (1)HOX bul) Ja (	Base Sep0321 Dec14/21	vironmental - 415	- Michigan Ea
AR Sample No.	Viscosity @ 100° Viscosity @ 100°	C C C C C C C C C C C C C C	son Ave., Ca	10.1 (0HOX Bul) Jan 2023	Base Sep0321 Dec14/21	vironmental - 415	- <b>Michigan Ea</b> 6200 Elmrido
Sample No. Lab Number	Viscosity @ 100° Viscosity @ 100°	C C C C C C C C C C C C C C	son Ave., Ca d : 16 . ed : 18 .	10.1 (0)HOX bul) Ja (0)HOX bul) Ja (1)HOX bul) Ja (	3 GFL Env	vironmental - 415	- Michigan Ea
Sample No. Lab Number Unique Numbe te 12367 Test Package	Viscosity @ 100° Viscosity @ 100° Viscosity @ 100°	C 501 Madia Received Diagnost Tests: Fu	son Ave., Ca d : 16, ed : 18, tician : Jon uelDilution, P	try, NC 2751: Jan 2023 Jan 2023 Jathan Heste ercentFuel )	3 GFL Env	r <b>ironmental - 415</b> Sterl	- <b>Michigan Ea</b> 6200 Elmride ling Heights, I

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

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