

## RECOMMENDATION

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

PROBLEMATIC TEST RESULTS							
Sample Status				MARGINAL	ABNORMAL	SEVERE	
Fuel	%	ASTM D3524	>3.0	<u> </u>	<b>3</b> .2	8.8	

Customer Id: GFL415 Sample No.: GFL0101519 Lab Number: 06010500 Test Package: FLEET



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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

There are no recommended actions for this sample.

### **HISTORICAL DIAGNOSIS**

### 08 Jun 2023 Diag: Don Baldridge



We advise that you check the fuel injection system. Oil and filter change at the time of sampling has been noted. Resample at the next service interval to monitor.Cylinder, crank, or cam shaft wear is indicated. 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.

#### 07 Feb 2023 Diag: Doug Bogart

FUEL

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. There is a high amount of fuel present in the oil. The BN result indicates that there is suitable alkalinity remaining in the oil. Fuel is present in the oil and is lowering the viscosity. The oil is no longer serviceable due to the presence of contaminants.



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view report



### 31 Oct 2022 Diag: Don Baldridge

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 All component wear rates are normal. Elemental level of silicon (Si) above normal. The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.



Report Id: GFL415 [WUSCAR] 06010500 (Generated: 11/20/2023 08:55:47) Rev: 1



# **OIL ANALYSIS REPORT**

Sample Rating Trend





Component **Diesel Engine** Fluid

Machine Id 489M

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

DIAGNOSIS	SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
A Recommendation	Sample Number		Client Info		GFL0101519	GFL0081413	GFL0068676
No corrective action is recommended at this time.	Sample Date		Client Info		15 Nov 2023	08 Jun 2023	07 Feb 2023
Resample at the next service interval to monitor.	Machine Age	hrs	Client Info		25555	24373	23607
Wear	Oil Age	hrs	Client Info		24373	23607	22967
All component wear rates are normal.	Oil Changed		Client Info		Not Changd	Changed	Changed
Contamination	Sample Status				MARGINAL	ABNORMAL	SEVERE
Light fuel dilution occurring. No other contaminants were detected in the oil.	CONTAMINAT	ION	method	limit/base	current	history1	history2
Fluid Condition	Glycol		WC Method		NEG	NEG	NEG
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the	WEAR METAL	S	method	limit/base	current	history1	history2
oil is suitable for further service.	Iron	ppm	ASTM D5185m	>90	20	<b>1</b> 20	51
	Chromium	ppm	ASTM D5185m	>20	2	4	2
	Nickel	ppm	ASTM D5185m	>2	0	1	<1
	Titanium	ppm	ASTM D5185m	>2	<1	0	0
	Silver	ppm	ASTM D5185m	>2	0	0	<1
	Aluminum	ppm	ASTM D5185m	>20	4	5	1
	Lead	ppm	ASTM D5185m	>40	<1	2	2
	Copper	ppm	ASTM D5185m	>330	49	4	2
	Tin	ppm	ASTM D5185m	>15	<1	1	1
	Vanadium	ppm	ASTM D5185m		<1	0	0
	Cadmium	ppm	ASTM D5185m		0	0	0
	ADDITIVES		method	limit/base	current	history1	history2
	Boron	ppm	ASTM D5185m	0	4	4	2
	Boron Barium	ppm ppm	ASTM D5185m ASTM D5185m		4 0	4	2
				0			
	Barium	ppm ppm	ASTM D5185m ASTM D5185m	0 60	0	0	0
	Barium Molybdenum	ppm ppm ppm	ASTM D5185m	0 60 0	0 53	0 53	0 48
	Barium Molybdenum Manganese	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	0 60 0 1010	0 53 1	0 53 1	0 48 1
	Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 60 0 1010 1070	0 53 1 832	0 53 1 770	0 48 1 786
	Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 60 0 1010 1070 1150	0 53 1 832 1112	0 53 1 770 962	0 48 1 786 1025
	Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 60 0 1010 1070 1150 1270	0 53 1 832 1112 963	0 53 1 770 962 1009	0 48 1 786 1025 837
	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 60 0 1010 1070 1150 1270	0 53 1 832 1112 963 1218 2719	0 53 1 770 962 1009 1287	0 48 1 786 1025 837 1067
	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	0 60 0 1010 1070 1150 1270 2060	0 53 1 832 1112 963 1218 2719	0 53 1 770 962 1009 1287 2837	0 48 1 786 1025 837 1067 2608
	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 60 0 1010 1070 1150 1270 2060 limit/base >25	0 53 1 832 1112 963 1218 2719 current	0 53 1 770 962 1009 1287 2837 history1	0 48 1 786 1025 837 1067 2608 history2
	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 60 0 1010 1070 1150 1270 2060 limit/base >25	0 53 1 832 1112 963 1218 2719 current 8	0 53 1 770 962 1009 1287 2837 history1 13	0 48 1 786 1025 837 1067 2608 history2 11
	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b> ASTM D5185m ASTM D5185m	0 60 0 1010 1070 1150 1270 2060 limit/base >25 >20	0 53 1 832 1112 963 1218 2719 current 8 8 8	0 53 1 770 962 1009 1287 2837 history1 13 11	0 48 1 786 1025 837 1067 2608 history2 11 8
	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m	0 60 0 1010 1070 1150 1270 2060 limit/base >25 >20 >20	0 53 1 832 1112 963 1218 2719 current 8 8 8 3 ▲ 1.7	0 53 1 770 962 1009 1287 2837 history1 13 13 11 2 2 3.2	0 48 1 786 1025 837 1067 2608 history2 11 8 2 2 € 8.8
	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm <b>TS</b> ppm ppm	ASTM D5185m ASTM D5185m	0 60 0 1010 1070 1150 1270 2060 limit/base >25 >20 >3.0	0 53 1 832 1112 963 1218 2719 current 8 8 3 ▲ 1.7 current	0 53 1 770 962 1009 1287 2837 history1 13 13 11 2 2 ▲ 3.2 history1	0 48 1 786 1025 837 1067 2608 history2 11 8 2 2 ● 8.8 history2
	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m	0 60 0 1010 1070 1150 2060 2060 225 >20 >20 >3.0 Limit/base >6	0 53 1 832 1112 963 1218 2719 current 8 8 8 3 ▲ 1.7 current 0.4	0 53 1 770 962 1009 1287 2837 history1 13 13 11 2 2 3.2	0 48 1 786 1025 837 1067 2608 history2 11 8 2 2 € 8.8 history2 0.8
	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm <b>TS</b> ppm ppm	ASTM D5185m ASTM D5824 ASTM D5844 *ASTM D7844	0 60 1010 1070 1150 2060 limit/base >25 >20 >3.0 limit/base >6 >20	0 53 1 832 1112 963 1218 2719 current 8 8 3 ▲ 1.7 current	0 53 1 770 962 1009 1287 2837 history1 13 13 11 2 3.2 Mistory1 1.9 1.9 10.2	0 48 1 786 1025 837 1067 2608 history2 11 8 2 2 8.8 kistory2 0.8 10.9
	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm <b>TS</b>	ASTM D5185m ASTM D5185m	0 60 1010 1070 1150 2060 limit/base >25 >20 >3.0 limit/base >6 >20	0 53 1 832 1112 963 1218 2719 current 8 8 8 3 ▲ 1.7 current 0.4	0 53 1 770 962 1009 1287 2837 history1 13 11 2 3.2 history1 1.9	0 48 1 786 1025 837 1067 2608 history2 11 8 2 2 € 8.8 history2 0.8
	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm tTS ppm ppm ppm ppm %	ASTM D5185m ASTM D5185m	0 60 1010 1070 1150 2060 limit/base >25 >20 >3.0 limit/base >6 >20	0 53 1 832 1112 963 1218 2719 current 8 8 8 3 ▲ 1.7 current 0.4 8.3 19.5	0 53 1 770 962 1009 1287 2837 history1 13 13 11 2 3.2 Mistory1 1.9 1.9 10.2	0 48 1 786 1025 837 1067 2608 history2 11 8 2 2 8.8 kistory2 0.8 10.9
	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	0 60 0 1010 1070 1150 2060 2060 225 >20 >20 >3.0 Iimit/base >6 >20 >30 Iimit/base	0 53 1 832 1112 963 1218 2719 current 8 8 8 3 ▲ 1.7 current 0.4 8.3 19.5	0 53 1 770 962 1009 1287 2837 history1 13 11 2 ▲ 3.2 history1 1.9 10.2 26.9	0 48 1 786 1025 837 1067 2608 history2 11 8 2 € 8.8 history2 0.8 10.9 21.4

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

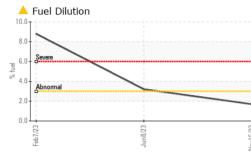
7.5

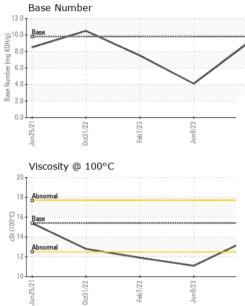
4.1

9.0



# **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
Jun8/23	5/23 -		scalar	*Visual	NORML	NORML	NORML	NORML
Jun	Nov15/23	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	ERTIES	method	limit/base	current	history1	history
		Visc @ 100°C	cSt	ASTM D445	15.4	13.7	▲ 11.1	11.9
	$\checkmark$	GRAPHS						
		Ferrous Alloys						
/23	23 -	120 iron		$\wedge$				
Feb7/23	Jun8/23	100 - necessary chromium						
		80 -	/					
		튭 60 -						
		40	_		$\mathbf{\lambda}$			
		30						
		20-						
		5 51	53	2				
		Jun 25/21 0ct31/22	Feb 7/23	Jun8/23	Nov15/23			
				7	N			
23	23	Non-ferrous Met	ais					
Feb7/23	Jun8/23	copper						
		40 tin			/			
		30-						
		Edd						
		20		/				
		10						
		10		/				
		0			1000.000.00			
		Jun25/2	Feb7/23	Jun8/23	Vov15/23			
				٦n	Nov			
		Viscosity @ 100°	С			Base Numbe	er	
		18 - Abnormal		1	12.0			
		17-			10.0	Base	Accession 199	
		16 Base			0.0 80H/0) Base Number (mg KOH/0)	-		
					<u>⊋</u> 0.0			
		()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()-015 ()						
					4.0			$\sim$
		13 Abnormal			as Ba			
		13 Abnormal		_ /				
		12-		$\checkmark$	2.0			
		12 11- 10	23	33	2.0	21	53	53
		12 11- 10	Feb7/23	Jun8/23	2.0	un25/21	<sup>5</sup> eb7/23 +	Jun8/23
		12-	Feb 7/23	Jun8/23	2.0	Jun25/21	Feb7/23	Jun8/23
d	Laboratory	: WearCheck USA -	501 Madi	son Ave., Ca	2.0 0.0 EZ(51/00) ry, NC 27513		nvironmental - 4	15 - Michigan E
NAB	Sample No.	: WearCheck USA - : GFL0101519	501 Madi	son Ave., Ca d : 17	ry, NC 27513 Nov 2023		nvironmental - 4	1 <b>5 - Michigan E</b> a 6200 Elmrid
	Sample No. Lab Number	: WearCheck USA - : GFL0101519 : 06010500	501 Madi Received Diagnos	son Ave., Ca d : 17   ed : 20	ry, NC 27513 Nov 2023 Nov 2023		nvironmental - 4	<b>15 - Michigan E</b> 6200 Elmrid erling Heights,
	Sample No. Lab Number Unique Numbe	: WearCheck USA - : GFL0101519 : 06010500 r : 10749644	501 Madi Received Diagnos Diagnos	son Ave., Ca d : 17   ed : 20   tician : We	ry, NC 27513 Nov 2023		<b>nvironmental - 4</b> Ste	<b>15 - Michigan E</b> 6200 Elmrid erling Heights, US 483
icate L2367	Sample No. Lab Number Unique Numbe Test Package	: WearCheck USA - : GFL0101519 : 06010500 r : 10749644	501 Madi Received Diagnos Diagnos I Tests: Pe	son Ave., Ca d : 17   ed : 20   tician : We ercentFuel )	2.0 0.0 ry, NC 27513 Nov 2023 Nov 2023 s Davis		<b>nvironmental - 4</b> Ste Cont	<b>15 - Michigan E</b> 6200 Elmric erling Heights,

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