

## **OIL ANALYSIS REPORT**

Sample Rating Trend





## Component

Diesel Engine

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

## DIAGNOSIS

#### Recommendation

Resample at the next service interval to monitor.

#### Wear

All component wear rates are normal.

#### Contamination

There is no indication of any contamination in the oil.

## Fluid Condition

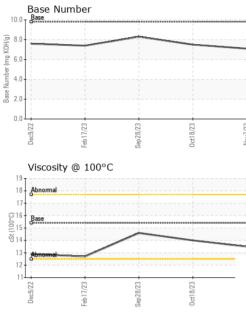
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		GFL0094786	GFL0086334	GFL0078681
Sample Date		Client Info		07 Nov 2023	18 Oct 2023	28 Sep 2023
Machine Age	hrs	Client Info		3650	3528	3399
Oil Age	hrs	Client Info		406	284	0
Oil Changed		Client Info		N/A	Not Changd	N/A
Sample Status				NORMAL	NORMAL	NORMAL
CONTAMINAT	ION	method	limit/base	current	history1	history2
Fuel		WC Method	>5	<1.0	<1.0	<1.0
Glycol		WC Method		NEG	NEG	NEG
WEAR METAL	S	method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>110	15	12	7
Chromium	ppm	ASTM D5185m	>4	<1	<1	<1
Nickel	ppm	ASTM D5185m	>2	0	<1	<1
Titanium	ppm	ASTM D5185m		<1	<1	0
Silver	ppm	ASTM D5185m	>2	0	0	0
Aluminum	ppm	ASTM D5185m	>25	8	6	5
Lead	ppm	ASTM D5185m	>45	<1	<1	0
Copper	ppm	ASTM D5185m	>85	30	18	14
Tin	ppm	ASTM D5185m	>4	<1	0	0
Vanadium	ppm	ASTM D5185m		0	0	0
Cadmium	ppm	ASTM D5185m		0	<1	0
ADDITIVES		method	limit/base	current	history1	history2
ADDITIVES		methou	iiiiii/base	Current	history1	matoryz
Boron	ppm	ASTM D5185m	0	6	8	8
	ppm ppm					
Boron	ppm	ASTM D5185m	0	6	8	8
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m	0	6 0	8 3	8 0
Boron Barium	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60	6 0 9	8 3 7	8 0 6
Boron Barium Molybdenum Manganese	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0	6 0 9 <1	8 3 7 <1	8 0 6 <1
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010	6 0 9 <1 21	8 3 7 <1 56	8 0 6 <1 56
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010 1070	6 0 9 <1 21 2367	8 3 7 <1 56 2241	8 0 6 <1 56 2200
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010 1070 1150	6 0 9 <1 21 2367 962	8 3 7 <1 56 2241 956	8 0 6 <1 56 2200 914
Boron 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 ASTM D5185m	0 0 60 0 1010 1070 1150 1270	6 0 9 <1 21 2367 962 1153	8 3 7 <1 56 2241 956 1073	8 0 6 <1 56 2200 914 1082
Boron 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 ASTM D5185m ASTM D5185m	0 0 60 0 1010 1070 1150 1270 2060	6 0 9 <1 21 2367 962 1153 3537	8 3 7 <1 56 2241 956 1073 3812	8 0 6 <1 56 2200 914 1082 3845
Boron 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 ASTM D5185m ASTM D5185m	0 0 60 1010 1070 1150 1270 2060	6 0 9 <1 21 2367 962 1153 3537 current	8 3 7 <1 56 2241 956 1073 3812 history1	8 0 6 <1 56 2200 914 1082 3845 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b>	0 0 60 1010 1070 1150 1270 2060	6 0 9 <1 21 2367 962 1153 3537 current 6	8 3 7 <1 56 2241 956 1073 3812 history1 6	8 0 6 <1 56 2200 914 1082 3845 history2 5
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b> ASTM D5185m	0 0 60 0 1010 1070 1150 1270 2060 Limit/base >30	6 0 9 <1 21 2367 962 1153 3537 current 6 2	8 3 7 <1 56 2241 956 1073 3812 history1 6 0	8 0 6 <1 56 2200 914 1082 3845 history2 5 3
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m	0 0 60 0 1010 1070 1150 1270 2060 <b>limit/base</b> >30	6 0 9 <1 21 2367 962 1153 3537 current 6 2 17	8 3 7 <1 56 2241 956 1073 3812 history1 6 0 16	8 0 6 <1 56 2200 914 1082 3845 history2 5 3 8
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m	0 0 0 1010 1070 1150 1270 2060 <b>limit/base</b> >20 <b>limit/base</b>	6 0 9 <1 21 2367 962 1153 3537 current 6 2 17 current	8 3 7 <1 56 2241 956 1073 3812 history1 6 0 16 history1	8 0 6 <1 56 2200 914 1082 3845 history2 5 3 8 8 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm	ASTM D5185m ASTM D5185m	0 0 60 0 1010 1070 1150 1270 2060 limit/base >30 >20 limit/base >33	6 0 9 <1 21 2367 962 1153 3537 <u>current</u> 6 2 17 <u>current</u> 0.3	8 3 7 <1 56 2241 956 1073 3812 history1 6 0 16 history1 0.2	8 0 6 <1 56 2200 914 1082 3845 history2 5 3 8 8 history2 0.1
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	0 0 0 1010 1070 1150 1270 2060 imit/base >30 220 imit/base >3 >20	6 0 9 <1 21 2367 962 1153 3537 <i>current</i> 6 2 17 <i>current</i> 0.3 7.3	8 3 7 <1 56 2241 956 1073 3812 history1 6 0 16 history1 0.2 6.6	8 0 6 <1 56 2200 914 1082 3845 history2 5 3 8 8 history2 0.1 5.4
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	0 0 0 1010 1070 1150 1270 2060 <b>imit/base</b> >30 <b>imit/base</b> >3 >20	6 0 9 <1 21 2367 962 1153 3537 <u>current</u> 6 2 17 <u>current</u> 0.3 7.3 17.7	8 3 7 <1 56 2241 956 1073 3812 history1 6 0 16 history1 0.2 6.6 16.5	8 0 6 <1 56 2200 914 1082 3845 history2 5 3 8 8 history2 0.1 5.4 15.4
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm ppm	ASTM D5185m ASTM D7844 *ASTM D7844 *ASTM D7844	0 0 0 1010 1070 1150 1270 2060 2060 2060 2060 200 200 200 200 20	6 0 9 <1 21 2367 962 1153 3537 current 6 2 17 current 0.3 7.3 17.7 current	8 3 7 <1 56 2241 956 1073 3812 history1 6 0 16 history1 0.2 6.6 16.5 history1	8 0 6 <1 56 2200 914 1082 3845 history2 5 3 8 8 history2 0.1 5.4 15.4 15.4 history2



# **OIL ANALYSIS REPORT**

VISUAL



		White Metal Yellow Metal Precipitate	scalar scalar scalar	*Visual *Visual *Visual	NONE NONE NONE	NONE NONE NONE	NONE NONE 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	
Sep 28/23	0ct18/23 Nov7/23	Appearance	scalar	*Visual	NORML	NORML	NORML	NORML	
Sep	Nc	Odor	scalar	*Visual	NORML	NORML	NORML	NORML	
l°C		Emulsified Water	scalar	*Visual	>0.2	NEG	NEG	NEG	
		Free Water	scalar	*Visual		NEG	NEG	NEG	
		FLUID PROPE Visc @ 100°C		method	limit/base	current 13.5	history1	history2 14.6	
			cSt	ASTM D445	15.4	13.5	14.0	14.0	
		GRAPHS Ferrous Alloys							
		40 T							
Sep 28/23	0ct18/23 -	35 - iron chromium							
Sep 2	Oct1	30 - nickel		 					
		25							
		톱 20 15							
		10							
		5-	$\sim$						
		Dec9/22 -eb 17/23	Sep28/23	0ct18/23	Nov7/23				
		ш.		Oct	Na				
		Non-ferrous Meta	ls						
		copper			/				
		25 - second lead		/					
		20 -							
		<u>۾</u> 15 -							
		10	/						
		5							
		0/22	3/23 -	3/23 -	//23				
		Dec9/22 Feb17/23	Sep28/23	0ct18/23	Nov7/23				
		Viscosity @ 100°				Raco Number			
		<sup>19</sup>			10.0	Base Number			
		18 - Abnormal							
		17-			(B/HC				
		Base 15 3 14			0.0 Base Number (mg KOHV6)				
		2)15- 55	~		mber (				
					4.0				
		Abhormal	1	1	2.0	-			
		11							
		Dec9/22 - Feb17/23 -	Sep28/23 -	0ct18/23 -	Nov7/23	Dec9/22 - Feb11/23 -	Sep28/23 -	Oct18/23 - Nov7/23 -	
		Pei Dei	Sep 2	0ct1	No	Feb 1	Sep2	0ct1 Nov	
Certificate L2367	Laboratory Sample No. Lab Number Unique Number Test Package	: GFL0094786 : 06003975 : 10737737 : FLEET	501 Madison Ave., Cary, NC 27513 Received : 10 Nov 2023 Diagnosed : 14 Nov 2023 Diagnostician : Don Baldridge				GFL environmental - 867 - Trafford (Blount Hauling) 1130 County Line Rd Trafford, AL US 35172 Contact: Jonathan Williams		
		contact Customer Serv				jo	onathan.willia	ms@gflenv.com	
		are outside of the ISO cifications are based on t				JCGM 106:2012)		T: F:	

limit/base

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Submitted By: see also GFL868 - Chelsea Bryan