

## **OIL ANALYSIS REPORT**

Sample Rating Trend





## Component

**Diesel Engine** Fluic

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.

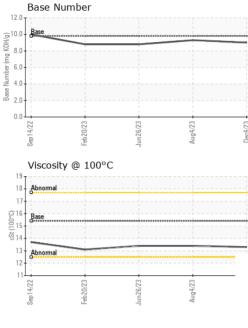
### Fluid Condition

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		method	limit/base	ourropt	history1	history2
	WATION		minubase	current	history1	
Sample Number		Client Info		GFL0100049	GFL0062202	GFL0062189
Sample Date		Client Info		04 Dec 2023	04 Aug 2023	26 Jun 2023
Machine Age	hrs	Client Info		17021	17020	17024
Oil Age	hrs	Client Info		191	191	195
Oil Changed		Client Info		Not Changd	Not Changd	Not Changd
Sample Status				NORMAL	NORMAL	NORMAL
CONTAMINAT	ION	method	limit/base	current	history1	history2
Fuel		WC Method	>5	<1.0	<1.0	<1.0
Water		WC Method	>0.2	NEG	NEG	NEG
Glycol		WC Method		NEG	NEG	NEG
WEAR METAL	S	method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>100	8	5	5
Chromium	ppm	ASTM D5185m	>20	<1	0	<1
Nickel	ppm	ASTM D5185m	>4	0	0	<1
Titanium	ppm	ASTM D5185m		0	0	0
Silver	ppm	ASTM D5185m	>3	0	<1	0
Aluminum	ppm	ASTM D5185m	>20	2	<1	2
Lead	ppm	ASTM D5185m	>40	0	<1	0
Copper	ppm	ASTM D5185m	>330	<1	<1	1
Tin	ppm	ASTM D5185m	>15	0	0	<1
Vanadium	ppm	ASTM D5185m		0	0	0
Cadmium	ppm	ASTM D5185m		0	0	0
ADDITIVES		method	limit/base	current	history1	history2
ADDITIVES Boron	ppm	method ASTM D5185m	limit/base	current 10	history1 8	history2 9
	ppm ppm					
Boron		ASTM D5185m	0	10	8	9
Boron Barium	ppm	ASTM D5185m ASTM D5185m	0	10 0	8 2	9 0
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60	10 0 64	8 2 65	9 0 60
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0	10 0 64 0	8 2 65 0	9 0 60 <1
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010	10 0 64 0 901	8 2 65 0 886	9 0 60 <1 928
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010 1070	10 0 64 0 901 1077	8 2 65 0 886 1165	9 0 60 <1 928 1118
Boron 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 0 1010 1070 1150	10 0 64 0 901 1077 950	8 2 65 0 886 1165 1025	9 0 60 <1 928 1118 1031
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	10 0 64 0 901 1077 950 1204	8 2 65 0 886 1165 1025 1221	9 0 60 <1 928 1118 1031 1261
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	0 0 60 0 1010 1070 1150 1270 2060	10 0 64 0 901 1077 950 1204 3139	8 2 65 0 886 1165 1025 1221 3418	9 0 60 <1 928 1118 1031 1261 3744
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	0 0 60 1010 1070 1150 1270 2060	10 0 64 0 901 1077 950 1204 3139 current	8 2 65 0 886 1165 1025 1221 3418 history1	9 0 60 <1 928 1118 1031 1261 3744 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 ASTM D5185m	0 0 60 0 1010 1070 1150 1270 2060 <b>limit/base</b>	10 0 64 0 901 1077 950 1204 3139 current 4	8 2 65 0 886 1165 1025 1221 3418 history1 2	9 0 60 <1 928 1118 1031 1261 3744 history2 2
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 ASTM D5185m ASTM D5185m	0 0 60 0 1010 1070 1150 1270 2060 <b>limit/base</b>	10 0 64 0 901 1077 950 1204 3139 current 4 12	8 2 65 0 886 1165 1025 1221 3418 history1 2 3	9 0 60 <1 928 1118 1031 1261 3744 history2 2 9
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> >25 >20	10 0 64 0 901 1077 950 1204 3139 current 4 12 3	8 2 65 0 886 1165 1025 1221 3418 history1 2 3 3 3	9 0 60 <1 928 1118 1031 1261 3744 history2 2 9 1
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 2060 225 >25	10 0 64 0 901 1077 950 1204 3139 current 4 12 3 3	8 2 65 0 886 1165 1025 1221 3418 history1 2 3 3	9 0 60 <1 928 1118 1031 1261 3744 history2 2 9 1 1 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 0 1010 1070 1150 1270 2060 2060 225 >25 >20 Limit/base >20	10 0 64 0 901 1077 950 1204 3139 <u>current</u> 4 12 3 <u>current</u> 0.1	8 2 65 0 886 1165 1025 1221 3418 history1 2 3 3 3 <i>history1</i> 0.1	9 0 60 <1 928 1118 1031 1261 3744 history2 2 9 1 1 history2 0.2
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 >25 >20 imit/base >3 >20	10 0 64 0 901 1077 950 1204 3139 current 4 12 3 <i>current</i> 0.1 6.2	8 2 65 0 886 1165 1025 1221 3418 history1 2 3 3 3 history1 0.1 6.9	9 0 60 <1 928 1118 1031 1261 3744 history2 2 9 1 1 history2 0.2 6.5
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 ppm	ASTM D5185m ASTM D7844 *ASTM D7624 *ASTM D7415	0 0 0 1010 1070 1150 1270 2060 2060 225 20 220 220 20 3 20 20 20 3 3 20 20 20 20 20 20 20 20 20 20 20 20 20	10 0 64 0 901 1077 950 1204 3139 Current 4 12 3 Current 0.1 6.2 17.6	8 2 65 0 886 1165 1025 1221 3418  1221 3418  122 3 0.1 6.9 17.7  history1	9 0 60 <1 928 1118 1031 1261 3744 history2 2 9 1 2 9 1 1 history2 0.2 6.5 18.6 history2
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 2060 225 20 225 20 20 3 20 3 20 3 20 20 20 20 20 20 20 20 20 20 20 20 20	10 0 64 0 901 1077 950 1204 3139 <u>current</u> 4 12 3 <u>current</u> 0.1 6.2 17.6	8 2 65 0 886 1165 1025 1221 3418  history1 2 3 3 0.1 6.9 17.7	9 0 60 <1 928 1118 1031 1261 3744 <b>history2</b> 2 9 1 <b>history2</b> 0.2 6.5 18.6



# **OIL ANALYSIS REPORT**



		VISUAL		method	limit/base	current	history1	history2		
		White Metal	scalar	*Visual	NONE	NONE	NONE	NONE		
		Yellow Metal		*Visual	NONE	NONE	NONE	NONE		
	Precipitate		*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		
Jun26/23	Aug4/23 Dec4/23	Appearance	scalar	*Visual	NORML	NORML	NORML	NORML		
٦u	A D	Ouoi		*Visual	NORML	NORML	NORML	NORML		
		Emulsified Water	scalar	*Visual	>0.2	NEG	NEG	NEG		
		Free Water		*Visual		NEG	NEG	NEG		
		FLUID PROPI		method	limit/base	current	history1	history2		
		Visc @ 100°C	cSt	ASTM D445	15.4	13.3	13.4	13.4		
		GRAPHS								
		Ferrous Alloys								
3/23	/23	14 - iron iron								
Jun26/23	Aug4/23	12 - nickel								
		10								
		E 8-			/					
		6								
		4-								
		2 - Phase in the same in the s								
		5 52	/23	/23	/23					
		Sep 14/22 Feb 20/23	Jun26/23	Aug4/23	Dec4/23					
		Non-ferrous Meta	,							
		10 T								
	8 - copper									
		° tin								
		6								
		E dd								
		**								
		2-								
			Research and the second states	A REAL PROPERTY AND IN COLUMN						
		sep14/22		Aug4/23 .	Dec4/23					
		Sep1 Feb2	Jun26/23	Aug	Dec					
		Viscosity @ 100°	C			Base Number				
		19 18 - Abnormal		· · · · · · · · · · · · · · · · · · ·	12.0			1		
		17-				Base				
		i i i			0.8 KOH					
		G 16 B ase 15 5 14			ی تہ 6.0					
		ts 14			nupe					
		12			6.0 4.0 8 8 8 8 8 8 8 8 8 8					
		13 Abnormal			2.0					
		11			0.0					
		Sep 14/22 Feb 20/23	Jun26/23	Aug4/23	Dec4/23	Sep 14/22 Feb 20/23	Jun26/23	Aug4/23		
		Sep	Jun	Au	De	Sep.	Jun	Au		
	Laboratory	: WearCheck USA -	WearCheck USA - 501 Madison Ave., Cary, NC 27513					GFL Environmental - 626 - Cadillac Haulin		
	Sample No.	: GFL0100049						1 Ron Wilson S		
NAP			d · 121	Dec 2023			Cadillac, N			
	Lab Number	: 06029871	Diagnose							
	Lab Number Unique Number Test Package	r :10779662	Diagnosti		s Davis		Contract	US 4960 ARY BREWE		

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Submitted By: GARY BREWER

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