

# **OIL ANALYSIS REPORT**

#### Sample Rating Trend





## Component

## Diesel Engine

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

### 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.

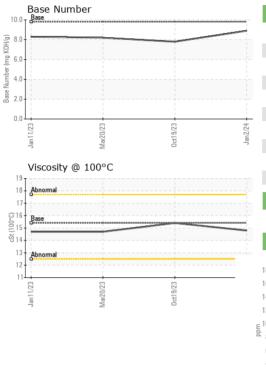
### Fluid Condition

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

SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		GFL0108519	GFL0066037	GFL0066114
Sample Date		Client Info		02 Jan 2024	19 Oct 2023	20 Mar 2023
Machine Age	hrs	Client Info		0	0	13046
Oil Age	hrs	Client Info		0	0	500
Oil Changed		Client Info	N/A		N/A	Changed
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	>80	17	11	15
Chromium	ppm		>5	1	<1	1
Nickel	ppm	ASTM D5185m	>2	0	0	0
Titanium	ppm	ASTM D5185m	~_	0	0	0
Silver	ppm	ASTM D5185m	>3	0	0	0
Aluminum	ppm		>30	10	8	13
Lead	ppm	ASTM D5185m	>30	0	0	0
Copper	ppm		>150	3	4	4
Tin	ppm	ASTM D5185m	>5	0	0	<1
Vanadium	ppm	ASTM D5185m	20	0	0	0
Cadmium	ppm	ASTM D5185m		0	0	0
e dan dan	pp			•	0	0
		method	limit/hase	current	history1	history2
ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185m	0	0	0	9
Boron Barium	ppm	ASTM D5185m ASTM D5185m	0	0 0	0	9 0
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60	0 0 58	0 0 59	9 0 67
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0	0 0 58 0	0 0 59 <1	9 0 67 <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	0 0 58 0 959	0 0 59 <1 947	9 0 67 <1 995
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010 1070	0 0 58 0 959 1083	0 0 59 <1 947 1117	9 0 67 <1 995 1180
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	0 0 58 0 959 1083 1032	0 0 59 <1 947 1117 1032	9 0 67 <1 995 1180 1064
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	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	0 0 58 0 959 1083 1032 1209	0 0 59 <1 947 1117 1032 1283	9 0 67 <1 995 1180 1064 1317
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	0 0 58 0 959 1083 1032 1209 3252	0 0 59 <1 947 1117 1032 1283 2881	9 0 67 <1 995 1180 1064 1317 3515
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	0 0 58 0 959 1083 1032 1209 3252 current	0 0 59 <1 947 1117 1032 1283 2881 history1	9 0 67 <1 995 1180 1064 1317 3515 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 1010 1070 1150 1270 2060	0 0 58 0 959 1083 1032 1209 3252 current 5	0 0 59 <1 947 1117 1032 1283 2881 history1 5	9 0 67 <1 995 1180 1064 1317 3515 history2 6
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	0 0 60 1010 1070 1150 1270 2060 kimit/base	0 0 58 0 959 1083 1032 1209 3252 current 5 <	0 0 59 <1 947 1117 1032 1283 2881 history1 5 1	9 0 67 <1 995 1180 1064 1317 3515 history2 6 1
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 0 1010 1070 1150 1270 2060 >20 >20	0 0 58 0 959 1083 1032 1209 3252 current 5 < 1 3	0 0 59 <1 947 1117 1032 1283 2881 history1 5 1 3	9 0 67 <1 995 1180 1064 1317 3515 history2 6 1 4
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED	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> >20	0 0 58 0 959 1083 1032 1209 3252 current 5 <1 3 2	0 0 59 <1 947 1117 1032 1283 2881 history1 5 1 3 3 history1	9 0 67 <1 995 1180 1064 1317 3515 history2 6 1 4 4 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 ppm ppm	ASTM D5185m ASTM D5185m	0 0 0 1010 1070 1150 1270 2060 limit/base >20 20 limit/base	0 0 58 0 959 1083 1032 1209 3252 <u>current</u> 5 <1 3 <i>current</i>	0 0 59 <1 947 1117 1032 1283 2881 history1 5 1 3 history1 2.1	9 0 67 <1 995 1180 1064 1317 3515 history2 6 1 4 history2 1.3
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 TS ppm ppm ppm	ASTM D5185m ASTM D5185m	0 0 0 1010 1070 1150 1270 2060 <i>limit/base</i> >20 <i>limit/base</i> >20	0 0 58 0 959 1083 1032 1209 3252 current 5 <1 3 2 1209 3252 turrent 1.2 7.0	0 0 59 <1 947 1117 1032 1283 2881 history1 5 1 3 <i>history1</i> 2.1 9.3	9 0 67 <1 995 1180 1064 1317 3515 history2 6 1 4 <u>history2</u> 1.3 9.2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	0 0 0 1010 1070 1150 1270 2060 limit/base >20 20 limit/base	0 0 58 0 959 1083 1032 1209 3252 <u>current</u> 5 <1 3 <i>current</i>	0 0 59 <1 947 1117 1032 1283 2881 history1 5 1 3 history1 2.1	9 0 67 <1 995 1180 1064 1317 3515 history2 6 1 4 history2 1.3
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	0 0 0 1010 1070 1150 1270 2060 <i>limit/base</i> >20 <i>limit/base</i> >20	0 0 58 0 959 1083 1032 1209 3252 current 5 <1 3 2 1209 3252 turrent 1.2 7.0	0 0 59 <1 947 1117 1032 1283 2881 history1 5 1 3 <i>history1</i> 2.1 9.3	9 0 67 <1 995 1180 1064 1317 3515 history2 6 1 4 <u>history2</u> 1.3 9.2
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 TS ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	0 0 0 1010 1070 1150 1270 2060 <b>imit/base</b> >20 <b>imit/base</b> >3 >20 >3	0 0 58 0 959 1083 1032 1209 3252 current 5 <1 3 current 1.2 7.0 20.5	0 0 59 <1 947 1117 1032 1283 2881 history1 5 1 3 5 1 3 <i>history1</i> 2.1 9.3 23.3	9 0 67 <1 995 1180 1064 1317 3515 history2 6 1 4 <u>history2</u> 1.3 9.2 21.9
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation FLUID DEGRAE	ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D7844 *ASTM D7844	0 0 0 1010 1070 1150 2060 2060 200 200 200 200 200 200 200	0 0 58 0 959 1083 1032 1209 3252 current 5 <1 3 current 1.2 7.0 20.5 current	0 0 59 <1 947 1117 1032 1283 2881 history1 5 1 3 <i>history1</i> 2.1 9.3 23.3 history1	9 0 67 <1 995 1180 1064 1317 3515 history2 6 1 4 <b>history2</b> 1.3 9.2 21.9 history2



# **OIL ANALYSIS REPORT**



		VISUAL		method	limit/base			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	
Det19.023	Jan 2/24	Appearance	scalar	*Visual	NORML	NORML	NORML	NORML	
	Jar	Odor	scalar	*Visual	NORML	NORML	NORML	NORML	
		Emulsified Water	scalar	*Visual	>0.2	NEG	NEG	NEG	
		Free Water	scalar	*Visual		NEG	NEG	NEG	
		FLUID PROPE	RTIES	method	limit/base	current	history1	history2	
		Visc @ 100°C	cSt	ASTM D445	15.4	14.8	15.4	14.7	
		GRAPHS							
		Ferrous Alloys							
33	3	16 - iron			1				
0419/23		14- nickel							
		12							
		E <sup>10</sup>							
		6-							
		4-							
		2-	***********						
		3 53		23	24				
		Jan 1 1/23 Mar20/23		0ct19/23	Jan 2/24				
		⊸ ≥ Non-ferrous Meta	le	0					
		copper							
		8 - management tin							
		6-							
		u dd							
		4			_				
		2-							
		0							
		an 11/23 Aar20/23		0ct19/23 -	Jan 2/24 +				
		¬ ≥		Octi	Jar				
		Viscosity @ 100°C	C			Base Number			
		18 - Abnormal				T	-		
		17			(0)HOX Base Numper 4.0				
		<sup>ြာ16</sup> Base			9 6.0				
		C 16 Base 15 57 14			mber (				
					5N 4.0				
		13 Abnormal			2.0	-			
		12			0.0				
		1/23		- 2/6	Jan2/24 +	1/23	- 52/0	Jun 2/24	
		Jan 1 1/23 Mar20/23		0ct19/23	Jan	Jan 11/23	Mar20/23	Cual.	
4	Laboratory Sample No. Lab Number		Recieved Diagnose	i : 09 . ed : 10 .	Jan 2024 Jan 2024	4 11888 & 11863 30th Avenu 4 Chippewa Falls, W US 5472			
	Unique Number Test Package		Diagnost	ician : Wes	s Davis		Cont		
Certificate L2367	Test Package		•				Cont	US 5472 act: Andy Kan	

Submitted By: See also GFL904,A,B,C, 927, 938 - Andy Kane