

# **OIL ANALYSIS REPORT**

Sample Rating Trend

NORMAL





Machine Id 726082

#### Component Diesel Engine

Fluid 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

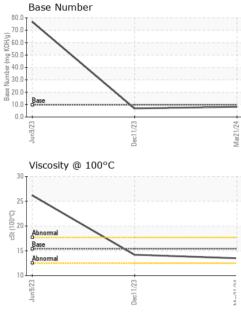
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

SAMPLE INFORI	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		GFL0097851	GFL0103599	GFL0085325
Sample Date		Client Info		21 Mar 2024	11 Dec 2023	09 Jun 2023
Machine Age	hrs	Client Info		16808	16808	16808
Oil Age	hrs	Client Info		480	603	355
Oil Changed		Client Info		N/A	N/A	Changed
Sample Status				NORMAL	NORMAL	SEVERE
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	▲ 0.20
WEAR METAL	S	method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>100	15	17	81
Chromium	ppm	ASTM D5185m	>20	<1	1	3
Nickel	ppm	ASTM D5185m	>4	0	<1	2
Titanium	ppm	ASTM D5185m		0	0	<1
Silver	ppm	ASTM D5185m	>3	0	0	0
Aluminum	ppm	ASTM D5185m	>20	3	2	8
Lead	ppm	ASTM D5185m	>40	0	3	4
Copper	ppm	ASTM D5185m	>330	<1	2	12
Tin	ppm	ASTM D5185m	>15	0	0	<1
Vanadium	ppm	ASTM D5185m		0	<1	0
Cadmium	ppm	ASTM D5185m		0	0	0
ADDITIVES		method	limit/base	current	history1	history2
ADDITIVES Boron	ppm	method ASTM D5185m	limit/base	current	history1 1	history2 587
	ppm ppm					
Boron		ASTM D5185m	0	1	1	587
Boron Barium	ppm	ASTM D5185m ASTM D5185m ASTM D5185m	0	1 0	1 0	587 4
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60	1 0 57	1 0 60	587 4 225
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0	1 0 57 0	1 0 60 0	587 4 225 1
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010 1070 1150	1 0 57 0 1003 1081 946	1 0 60 0 981 1033 954	587 4 225 1 777 897 887
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 ASTM D5185m	0 0 60 0 1010 1070 1150 1270	1 0 57 0 1003 1081 946 1260	1 0 60 0 981 1033 954 1267	587 4 225 1 777 897 887 1046
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	1 0 57 0 1003 1081 946	1 0 60 0 981 1033 954	587 4 225 1 777 897 887
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	1 0 57 0 1003 1081 946 1260	1 0 60 0 981 1033 954 1267	587 4 225 1 777 897 887 1046
Boron 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 ASTM D5185m ASTM D5185m	0 0 60 0 1010 1070 1150 1270 2060	1 0 57 0 1003 1081 946 1260 3546 <u>current</u> 5	1 0 60 0 981 1033 954 1267 3021 history1 7	587 4 225 1 777 897 897 887 1046 2797 history2 ▲ 117
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 0 1010 1070 1150 1270 2060	1 0 57 0 1003 1081 946 1260 3546 current	1 0 60 0 981 1033 954 1267 3021 history1	587 4 225 1 777 897 887 1046 2797 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>	1 0 57 0 1003 1081 946 1260 3546 <u>current</u> 5	1 0 60 0 981 1033 954 1267 3021 history1 7	587 4 225 1 777 897 897 887 1046 2797 history2 ▲ 117
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 0 1010 1070 1150 1270 2060 <b>limit/base</b>	1 0 57 0 1003 1081 946 1260 3546 25 5 7	1 0 60 981 1033 954 1267 3021 history1 7 27	587 4 225 1 777 897 887 1046 2797 history2 ▲ 117 ▲ 4995
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 <b>limit/base</b> >25	1 0 57 0 1003 1081 946 1260 3546 <u>current</u> 5 7 0	1 0 60 0 981 1033 954 1267 3021 <b>history1</b> 7 27 1	587 4 225 1 777 897 887 1046 2797 history2 ▲ 117 ▲ 4995 ▲ 73
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED	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	1 0 57 0 1003 1081 946 1260 3546 <b>current</b> 5 7 0 0	1 0 60 981 1033 954 1267 3021 history1 7 27 1 history1	587 4 225 1 777 897 887 1046 2797 history2 ▲ 117 ▲ 4995 ■ 73
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 limit/base >25 >20 limit/base >3	1 0 57 0 1003 1081 946 1260 3546 <i>current</i> 5 7 0 <i>current</i> 0.3	1 0 60 981 1033 954 1267 3021 history1 7 27 1 1 history1 0.3	587 4 225 1 7777 897 887 1046 2797 history2 ▲ 117 ▲ 4995 3 73 history2 0.5
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 2060 225 220 220 220 20 20 20 20 20 20 20 20 20	1 0 57 0 1003 1081 946 1260 3546 <i>current</i> 5 7 0 <i>current</i> 0.3 8.3	1 0 60 981 1033 954 1267 3021 history1 7 27 1 7 27 1 history1 0.3 10.3	587 4 225 1 7777 897 887 1046 2797 history2 ▲ 117 ▲ 4995 3 73 history2 0.5 20.4
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 2060 225 20 225 20 20 320 33 20 20 20	1 0 57 0 1003 1081 946 1260 3546 <b>current</b> 5 7 0 <b>current</b> 0.3 8.3 20.2	1 0 60 0 981 1033 954 1267 3021 history1 7 27 1 7 27 1 <i>history1</i> 0.3 10.3 22.1	587 4 225 1 7777 897 887 887 1046 2797 <b>history2</b> ▲ 117 ▲ 4995 ▲ 73 <b>history2</b> 0.5 20.4 14.5
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 ppm ppm	ASTM D5185m ASTM D7844 *ASTM D7844 *ASTM D7844	0 0 0 1010 1070 1150 1270 2060 2060 225 20 220 220 20 3 20 20 20 20 20 20 20 20 20 20 20 20 20	1 0 57 0 1003 1081 946 1260 3546 <b>current</b> 5 7 0 <b>current</b> 0.3 8.3 20.2 <b>current</b>	1 0 60 0 981 1033 954 1267 3021 history1 7 27 1 7 27 1 history1 0.3 10.3 22.1 history1	587 4 225 1 7777 897 887 1046 2797 history2 ▲ 117 ▲ 4995 3 73 history2 0.5 20.4 14.5



# **OIL ANALYSIS REPORT**

VISUAL



	White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
	Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
	Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
1	Silt	scalar	*Visual	NONE	NONE	NONE	NONE
	Debris	scalar	*Visual	NONE	NONE	NONE	NONE
	Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Mar21/24	Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Mar	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	13.5	14.2	<b>2</b> 6.2
	GRAPHS						
	Ferrous Alloys						
ACL F	80 - iron						
, C~~ FA	70 - nickel						
	<sup>60</sup>						
	E 40						
	30						
	20-	1					
	10						
	0	23.		24			
	/6unf	Dec11/23		Mar21/24			
	Non-ferrous Meta	_		2			
	<sup>12</sup>						
	10 - copper						
	management tin						
	8						
	ة o-						
	4						
	4 - Shadh minester the shadh as had been seen	-					
	Ed 6-	1					
	4			24			
	4	sc11/23		ar21/24			
	4 2 0 5 2 6 0 5 2 6 0 6 0 6 0 6 0 6 0 6 0 6 0 6 0 6 0 6	Dec:11/23		Mar21/24			
	4				Base Numb	er	
	Viscosity @ 100°			4701 172 BW 80. 70.	0 	er	
	Viscosity @ 100°			80.		er	
	Viscosity @ 100°			80.		er	
	Viscosity @ 100°			80.		er	
	Viscosity @ 100°			80. 70. (b)HOX 50. 140. 140. 140. 140. 140. 140. 140. 14		er	
	Viscosity @ 100°			80.		er	
	Viscosity @ 100° 28 26 24 20 20 20 20 20 20 20 20 20 20			80. 70. (b)HOX 50. 140. 140. 140. 140. 140. 140. 140. 14		er	
	Viscosity @ 100° 26 26 26 26 20 20 20 20 4 4 4 4 4 4 22 20 20 4 4 4 4 4 4 4 4 4 4 4 4 4	c		80. 70. (J)(HO) DU Ja quurun 100 100 100 100 100 100 100 100 100 100	Base		
	Viscosity @ 100° 26 26 26 26 20 20 20 20 4 4 4 4 4 4 22 20 20 4 4 4 4 4 4 4 4 4 4 4 4 4	c		80. 70. (J)(HO) DU Ja quurun 100 100 100 100 100 100 100 100 100 100	Base		
	Viscosity @ 100° 28 26 24 20 20 20 28 26 24 22 20 20 20 20 20 20 20 20 20			80, 70, (0)HOX 50, 40, 10, 10, 10, 10, 10, 10, 10, 10, 10, 1	Base	er Becl 1/23	
laboratory	Viscosity @ 100° 28 26 26 26 26 26 26 26 26 26 26	C Bec[1/23		80. 70. (b)HOX 60. 90. 90. 90. 90. 90. 90. 90. 90. 90. 9	Base Base CZGBung	Dect 1/23	Tri County HC Mee
Laboratory Sample No.	Viscosity @ 100° 28 26 26 26 26 26 26 26 26 26 26	C EZII1220 D1 Madiso		80. 70. 9(Ho) 50. 10. 10. 10. 10. 10. 10. 10. 10. 10. 1	Base Base CZGBung	EZILIAR Tvironmental - 958 -	
Laboratory Sample No. Lab Number	Viscosity @ 100° Viscosity @ 100° 26 26 26 26 26 26 26 26 26 26 26 26 26	C Bec[1/23	ived : 28	80. 70. (b)HOX 60. 90. 90. 90. 90. 90. 90. 90. 90. 90. 9	Base Base CZGBung	EZILIAR Tvironmental - 958 -	W. Jefferson
Sample No. Lab Number Unique Number	Viscosity @ 100° Viscosity @ 100° 26 24 22 20 20 20 20 20 20 20 20 20	C EZII1980 01 Madiso Recei	ived : 28 d : 30	80. 70. 9(Hoto) Bull Jack Market 10. 10. 10. 10. 10. 10. 10. 10. 10. 10.	GFL Er	EZILIAR Tvironmental - 958 -	Tri County HC Mor D W. Jefferson Morton, US 615
Sample No. Lab Number Unique Number Test Package	Viscosity @ 100° Viscosity @ 100° 26 24 22 20 20 20 20 20 20 20 20 20	C EZITER 01 Madiso Recei Teste Diagr	ived : 28 ed : 30 nosed : 30	80. 70. 90,000 pm 40. 10. 10. 10. 10. 10. 10. 10. 10. 10. 1	GFL Er	nvironmental - 958 - 1090	W. Jefferson Morton



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Submitted By: Also GFL958,958A, 958B - Bryan Link