

# **OIL ANALYSIS REPORT**

#### Sample Rating Trend



# Machine Id 913099

#### 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

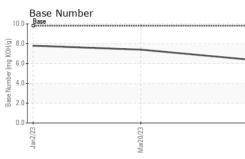
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

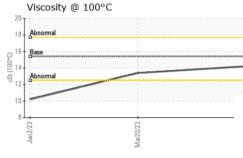
SAMPLE INFORI	MATION	method	limit/base	current	history 1	history 2
Sample Number		Client Info		GFL0084562	GFL0071468	GFL0071452
Sample Date		Client Info		14 Jun 2023	20 Mar 2023	02 Jan 2023
Machine Age	hrs	Client Info		1746	1154	611
Oil Age	hrs	Client Info		0	0	0
Oil Changed		Client Info		Changed	Changed	Changed
Sample Status				NORMAL	NORMAL	ATTENTION
CONTAMINAT	ION	method	limit/base	current	history 1	history 2
Fuel		WC Method	>5	<1.0	<1.0	0.5
Glycol		WC Method		NEG	NEG	NEG
WEAR METAL	S	method	limit/base	current	history 1	history 2
Iron	ppm	ASTM D5185m	>100	17	16	35
Chromium	ppm	ASTM D5185m	>20	1	<1	1
Nickel	ppm	ASTM D5185m	>4	2	4	11
Titanium	ppm	ASTM D5185m		0	0	<1
Silver	ppm	ASTM D5185m	>3	<1	1	2
Aluminum	ppm	ASTM D5185m	>20	6	1	4
Lead	ppm	ASTM D5185m	>40	3	0	2
Copper	ppm	ASTM D5185m	>330	19	26	122
Tin	ppm		>15	3	1	4
Vanadium	ppm	ASTM D5185m	210	<1	0	0
Cadmium	ppm	ASTM D5185m		<1	0	0
	ppm			··	-	
ADDITIVES		method	limit/base	current	history 1	history 2
Boron	ppm	ASTM D5185m	0	4	12	239
Boron Barium	ppm	ASTM D5185m ASTM D5185m	0	4 0	12 0	239 0
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60	4 0 68	12 0 68	239 0 116
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0	4 0 68 2	12 0 68 1	239 0 116 4
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010	4 0 68 2 1084	12 0 68 1 956	239 0 116 4 732
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	4 0 68 2 1084 1200	12 0 68 1 956 1158	239 0 116 4 732 1482
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	4 0 68 2 1084 1200 1092	12 0 68 1 956 1158 1004	239 0 116 4 732 1482 682
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	4 0 68 2 1084 1200 1092 1378	12 0 68 1 956 1158 1004 1270	239 0 116 4 732 1482 682 890
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	0 0 60 0 1010 1070 1150	4 0 68 2 1084 1200 1092	12 0 68 1 956 1158 1004	239 0 116 4 732 1482 682 890 2612
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	4 0 68 2 1084 1200 1092 1378	12 0 68 1 956 1158 1004 1270	239 0 116 4 732 1482 682 890
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 1010 1070 1150 1270 2060	4 0 68 2 1084 1200 1092 1378 3486	12 0 68 1 956 1158 1004 1270 3367	239 0 116 4 732 1482 682 890 2612
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	4 0 68 2 1084 1200 1092 1378 3486 current	12 0 68 1 956 1158 1004 1270 3367 history 1	239 0 116 4 732 1482 682 890 2612 history 2
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 imit/base >25	4 0 68 2 1084 1200 1092 1378 3486 current 5	12 0 68 1 956 1158 1004 1270 3367 history 1 9	239 0 116 4 732 1482 682 890 2612 history 2 71
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 imit/base >25	4 0 68 2 1084 1200 1092 1378 3486 <u>current</u> 5 4	12 0 68 1 956 1158 1004 1270 3367 history 1 9 2	239 0 116 4 732 1482 682 890 2612 <b>bistory 2</b> 71 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 0 1010 1070 1150 1270 2060 <b>imit/base</b> >25	4 0 68 2 1084 1200 1092 1378 3486 <u>current</u> 5 4 2	12 0 68 1 956 1158 1004 1270 3367 history 1 9 2 1	239 0 116 4 732 1482 682 890 2612 history 2 71 3 5
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 >20 <b>Imit/base</b> >20	4 0 68 2 1084 1200 1092 1378 3486 <u>current</u> 5 4 2 2	12 0 68 1 956 1158 1004 1270 3367 history 1 9 2 1 history 1	239 0 116 4 732 1482 682 890 2612 history 2 71 3 5 5
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 <b>Imit/base</b> >20	4 0 68 2 1084 1200 1092 1378 3486 <u>current</u> 5 4 2 2 <u>current</u>	12 0 68 1 956 1158 1004 1270 3367 <b>history 1</b> 9 2 1 9 2 1 <b>history 1</b> 0.3	239 0 116 4 732 1482 682 890 2612 history 2 71 3 5 5 history 2 0.3
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 ppm ppm	ASTM D5185m ASTM D5185m	0 0 0 1010 1070 1150 1270 2060 <i>limit/base</i> >25 >20 <i>limit/base</i> >3 >20	4 0 68 2 1084 1200 1092 1378 3486 <u>current</u> 5 4 2 2 <u>current</u> 0.5 9.9	12 0 68 1 956 1158 1004 1270 3367 history 1 9 2 1 9 2 1 history 1 0.3 8.8	239 0 116 4 732 1482 682 890 2612 history 2 71 3 5 5 history 2 0.3 10.0
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> >25 <b>imit/base</b> >3 >20	4 0 68 2 1084 1200 1092 1378 3486 <u>current</u> 5 4 2 2 <u>current</u> 0.5 9.9 22.7	12 0 68 1 956 1158 1004 1270 3367 history 1 9 2 1 1 0.3 8.8 20.7	239 0 116 4 732 1482 682 890 2612 history 2 71 3 5 history 2 0.3 10.0 24.2
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 ppm ppm ppm	ASTM D5185m ASTM D7844 *ASTM D7844 *ASTM D7844	0 0 0 1010 1070 1150 1270 2060 imit/base >25 20 imit/base >3 >20 30 imit/base	4 0 68 2 1084 1200 1092 1378 3486 <i>current</i> 5 4 2 <i>current</i> 0.5 9.9 22.7	12 0 68 1 956 1158 1004 1270 3367 history 1 9 2 1 9 2 1 1 0.3 8.8 20.7 history 1	239 0 116 4 732 1482 682 890 2612 history 2 71 3 5 history 2 0.3 10.0 24.2 history 2



# **OIL ANALYSIS REPORT**

VISUAL





White Metal						
white wetai	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
					NONE	NONE
Debris	scalar		NONE	NONE	NONE	NONE
						NONE
					NORML	NORML
Odor						NORML
						NEG
			20.L			NEG
			limit/base			history 2
						▲ 10.2
					1011	
<sup>35</sup> T						
30 - chromium						
25 - nickel						
_ 20						
ā 15	-					
10						
C						
/3	/23		/23 +			
Jan 2	/lar20		Jun 14			
Non-ferrous Meta	_		7			
<sup>140</sup> T						
120 - copper						
100-						
80						
			_			
0 2	23	************************	23			
Jan 2/	1ar20/		un14/			
<sup>19</sup> T	-		10.0	Base Number Base		
18 - Abnormal			10.0	0		
17			<sub>5</sub> 8.0-			
Dase			KOH/			
0014			B 6.0	1		
to 13 Abnormal			.0- 5 4.0-			
12			ase N			
11			<sup>66</sup> 2.0-			
9			0.0			
Jan2/23	Mar20/23 -			Jan 2/23 .	Mar20/23 -	
5	/lar2		2	ar	Ir2	
	Sand/Dirt Appearance Odor Emulsified Water Free Water Fluid PROPE Visc @ 100°C GRAPHS Ferrous Alloys	Debris scalar Sand/Dirt scalar Appearance scalar Odor scalar Emulsified Water scalar Free Water scalar Free Water scalar FLUID PROPERTIES Visc @ 100°C cSt GRAPHS Ferrous Alloys Copper Non-ferrous Metals Viscosity @ 100°C Viscosity @ 100°C	Debris scalar *Visual Sand/Dirt scalar *Visual Appearance scalar *Visual Codor scalar *Visual Emulsified Water scalar *Visual Free Water scalar *Visual FLUID PROPERTIES method Visc @ 100°C cSt ASTM D445 GRAPHS Ferrous Alloys CRAPHS Ferrous Metals Non-ferrous Metals Viscosity @ 100°C	Debris scalar *Visual NONE Sand/Dirt scalar *Visual NONE Appearance scalar *Visual NORML Odor scalar *Visual NORML Emulsified Water scalar *Visual >0.2 Free Water scalar *Visual >0.2 Non-ferrous Alloys Compared of the scalar *Visual *Vi	Debris scalar *Visual NONE NONE Sand/Dirt scalar *Visual NONE NONE Appearance scalar *Visual NORML NORML Color scalar *Visual NORML NORML Emulsified Water scalar *Visual >0.2 NEG Free Water scalar *Visual >0.2 NEG More definition of the scalar *Visual >0.2 NEG Nor ferrous Alloys Compared the scalar *Visual *0.5 Nor ferrous Metals Compared the scalar *Visual *0.5 Nor ferrous Metals *0.5 Nor ferro	Debris scalar *Visual NONE NONE NONE NONE Sand/Dirt scalar *Visual NORML NORML NORML NORML Appearance scalar *Visual NORML NORML NORML NORML Emulsified Water scalar *Visual NORML NORML NORML NORML Emulsified Water scalar *Visual NORML NORML NORML NORML Visc @ 100°C cSt ASTM D445 15.4 14.2 13.4 GRAPHS Ferrous Alloys Viscosity @ 100°C Viscosity @ 100°C

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