

### **OIL ANALYSIS REPORT**

Sample Rating Trend



# Machine Id 726052

#### 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

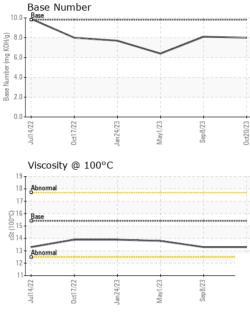
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

SAMPLE INFORI	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		GFL0097511	GFL0092917	GFL0067572
Sample Date		Client Info		20 Oct 2023	08 Sep 2023	01 May 2023
Machine Age	hrs	Client Info		20201	20007	19204
Oil Age	hrs	Client Info		19204	0	585
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	>2.0	<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	>100	13	9	11
Chromium	ppm	ASTM D5185m	>20	<1	0	<1
Nickel	ppm	ASTM D5185m	>4	<1	0	0
Titanium	ppm	ASTM D5185m		<1	0	0
Silver	ppm	ASTM D5185m	>3	0	0	0
Aluminum	ppm	ASTM D5185m	>20	2	2	0
Lead	ppm	ASTM D5185m	>40	1	1	<1
Copper	ppm	ASTM D5185m	>330	<1	<1	<1
Tin	ppm	ASTM D5185m	>15	<1	<1	<1
Vanadium	ppm	ASTM D5185m		<1	<1	0
Cadmium	ppm	ASTM D5185m		<1	0	0
ADDITIVES		method				history2
ADDITIVES Boron	ppm	method ASTM D5185m	limit/base	current 8	history1 10	history2 50
	ppm ppm	ASTM D5185m				
Boron Barium	ppm		0	8	10	50
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	0	8 <1	10 0	50 0 16
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m	0 0 60	8 <1 66	10 0 61	50 0
Boron Barium Molybdenum	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0	8 <1 66 0	10 0 61 <1	50 0 16 <1
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010 1070	8 <1 66 0 944	10 0 61 <1 965	50 0 16 <1 679
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 1150	8 <1 66 0 944 1121	10 0 61 <1 965 1194 1021	50 0 16 <1 679 1340
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	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	8 <1 66 0 944 1121 1056	10 0 61 <1 965 1194	50 0 16 <1 679 1340 770
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	8 <1 66 0 944 1121 1056 1283	10 0 61 <1 965 1194 1021 1274	50 0 16 <1 679 1340 770 907
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	8 <1 66 0 944 1121 1056 1283 3680	10 0 61 <1 965 1194 1021 1274 3676	50 0 16 <1 679 1340 770 907 3076
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	8 <1 66 0 944 1121 1056 1283 3680 current	10 0 61 <1 965 1194 1021 1274 3676 history1	50 0 16 <1 679 1340 770 907 3076 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	8 <1 66 0 944 1121 1056 1283 3680 current 3	10 0 61 <1 965 1194 1021 1274 3676 history1 3	50 0 16 <1 679 1340 770 907 3076 history2 4
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 >25	8 <1 66 0 944 1121 1056 1283 3680 current 3 4	10 0 61 <1 965 1194 1021 1274 3676 history1 3 3	50 0 16 <1 679 1340 770 907 3076 history2 4 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 60 0 1010 1070 1150 1270 2060 <b>limit/base</b> >25 >20	8 <1 66 0 944 1121 1056 1283 3680 current 3 4 3	10 0 61 <1 965 1194 1021 1274 3676 history1 3 3 2	50 0 16 <1 679 1340 770 907 3076 history2 4 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 TS ppm ppm	ASTM D5185m ASTM D5185m	0 0 0 1010 1070 1150 1270 2060 <b>limit/base</b> >25	8 <1 66 0 944 1121 1056 1283 3680 current 3 4 3 2 4 3	10 0 61 <1 965 1194 1021 1274 3676 history1 3 3 2 history1	50 0 16 <1 679 1340 770 907 3076 history2 4 1 4 1 4 <i>h</i> istory2
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 2060 225 >25 >20 1imit/base >20	8 <1 66 0 944 1121 1056 1283 3680 current 3 4 3 2 4 3 2 4 3 2 0.5	10 0 61 <1 965 1194 1021 1274 3676 history1 3 3 2 <u>history1</u> 0.4	50 0 16 <1 679 1340 770 907 3076 history2 4 1 4 1 4 <i>history2</i> 0.4
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc 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	8 <1 66 0 944 1121 1056 1283 3680 current 3 4 3 current 0.5 9.2	10 0 61 <1 965 1194 1021 1274 3676 history1 3 3 2 history1 0.4 8.0	50 0 16 <1 679 1340 770 907 3076 history2 4 1 4 1 4 history2 0.4 9.6
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	8 <1 66 0 944 1121 1056 1283 3680 current 3 4 3 current 0.5 9.2 20.0	10 0 61 <1 965 1194 1021 1274 3676 history1 3 3 2 history1 0.4 8.0 18.9	50 0 16 <1 679 1340 770 907 3076 history2 4 1 4 1 4 1 4 <b>history2</b> 0.4 9.6 19.8
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation FLUID DEGRAC	ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm ppm ppm	ASTM D5185m ASTM D7844 *ASTM D7844	0 0 0 1010 1070 1150 1270 2060 2060 225 20 225 20 220 20 3 20 20 20 20 20 20 20 20 20 20 20 20 20	8    <1   66   0   944   1121   1056   1283   3680   current   3   4   3   current   0.5   9.2   20.0   current	10 0 61 <1 965 1194 1021 1274 3676 history1 3 3 2 history1 0.4 8.0 18.9 history1	50 0 16 <1 679 1340 770 907 3076 history2 4 1 4 1 4 1 4 0.4 9.6 19.8 history2



## **OIL ANALYSIS REPORT**

VISUAL



	Laboratory Sample No. Lab Number Unique Number	: GFL0097511 : 05995376	Received Diagnose	501 Madison Ave., Cary, NC 27513 Received : 01 Nov 2023 Diagnosed : 02 Nov 2023 Diagnostician : Wes Davis <i>ice at 1-800-237-1369.</i>			GFL Environmental - 641 - Alpena 1241 KING SETTLEMENT RE ALPENA, M US 49707 Contact: DYLAN TOLAN dylan.tolan@gflenv.con			
		Juit 4/22	Jan 24/23 May 1/23	Sep 8/23	.0 0ct50/23	Juli 4/22	Jan24/23 May1/23	Sep 8/23		
		Base 3 14 Abnomal			(b)(HO) 6. 4. Base Number 8. 2.	D	~			
		19 18 - Abnormal 17 -			10.	Base				
		ਤੋਂ Viscosity @ 100°		S	Oct	Base Number				
			Jan 24, 23	Sep 8/23	Oct20/23					
		6- 								
		copper 8								
		Non-ferrous Met	,	Sep	0ct2					
		Juli 4/22	Jan 24, 23	Sep 8/23	0ct20/23					
		<u>ة</u> 10		$\checkmark$						
Jan 24/23 May1/23	Sep 8/23	15-								
		Ferrous Alloys		1						
		GRAPHS								
		Visc @ 100°C	cSt	ASTM D445		13.3	13.3	13.8		
		Free Water	scalar	*Visual method	limit/base	NEG current	NEG history1	NEG history2		
2		Emulsified Water	scalar	*Visual	>0.2	NEG	NEG	NEG		
Jan 24/23 May 1/23	Sep 8/23 0ct20/23	Odor	scalar	*Visual	NORML	NORML	NORML	NORML		
123	/23	_ Sand/Dirt Appearance	scalar scalar	*Visual *Visual	NONE NORML	NONE NORML	NONE NORML	NONE NORML		
		Debris	scalar	*Visual	NONE	NONE	NONE	NONE		
		Silt	scalar	*Visual	NONE	NONE	NONE	NONE		
		Yellow Metal Precipitate	scalar scalar	*Visual *Visual	NONE NONE	NONE NONE	NONE NONE	NONE		

Submitted By: GFL463 and GFL641 - DYLAN TOLAN