

## **OIL ANALYSIS REPORT**

Sample Rating Trend





Machine Id 912017 Component

Diesel Engine

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

				2 Mar2023			
	SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
	Sample Number		Client Info		GFL0101531	GFL0086627	GFL0073883
or.	Sample Date		Client Info		16 Nov 2023	21 Jun 2023	27 Mar 2023
	Machine Age	hrs	Client Info		5054	3967	3366
	Oil Age	hrs	Client Info		3967	3366	1489
	Oil Changed		Client Info		N/A	Changed	Changed
е	Sample Status				NORMAL	NORMAL	NORMAL
	CONTAMINAT	ION	method	limit/base	current	history1	history2
	Fuel		WC Method	>3.0	<1.0	<1.0	<1.0
	Water		WC Method	>0.2	NEG	NEG	NEG
ie	Glycol		WC Method		NEG	NEG	NEG
	WEAR METAL	S	method	limit/base	current	history1	history2
	Iron		ASTM D5185m	>120	11	19	25
	Chromium	ppm	ASTM D5185m		<1	<1	1
		ppm					
	Nickel	ppm	ASTM D5185m	>5	<1	1	2
	Titanium	ppm	ASTM D5185m		<1	<1	0
	Silver	ppm	ASTM D5185m	>2	0	0	0
	Aluminum	ppm	ASTM D5185m	>20	1	0	2
	Lead	ppm	ASTM D5185m	>40	0	0	0
	Copper	ppm	ASTM D5185m	>330	2	5	7
	Tin	ppm	ASTM D5185m	>15	0	<1	<1
	Vanadium	ppm	ASTM D5185m		0	<1	<1
	Cadmium	ppm	ASTM D5185m		0	0	0
	ADDITIVES		method	limit/base	current	history1	history2
	Boron	ppm	ASTM D5185m	0	<1	3	<1
	Barium		LOTH DEVOE	0	0	0	0
		ppm	ASTM D5185m	0	U	Ū	0
	Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m	60	59	63	57
	Molybdenum Manganese			60			
		ppm	ASTM D5185m	60	59	63	57
	Manganese	ppm ppm	ASTM D5185m ASTM D5185m	60 0	59 0	63 <1	57 1
	Manganese Magnesium Calcium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	60 0 1010	59 0 886	63 <1 963	57 1 894
	Manganese Magnesium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	60 0 1010 1070	59 0 886 1045 973	63 <1 963 1093	57 1 894 1050
	Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	60 0 1010 1070 1150	59 0 886 1045	63 <1 963 1093 964	57 1 894 1050 891
	Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	60 0 1010 1070 1150 1270	59 0 886 1045 973 1150	63 <1 963 1093 964 1205	57 1 894 1050 891 1197 2347
	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	60 0 1010 1070 1150 1270 2060 limit/base	59 0 886 1045 973 1150 2678	63 <1 963 1093 964 1205 2862	57 1 894 1050 891 1197 2347
	Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	60 0 1010 1070 1150 1270 2060 limit/base	59 0 886 1045 973 1150 2678 current	63 <1 963 1093 964 1205 2862 history1	57 1 894 1050 891 1197 2347 history2
	Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm ypm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b> ASTM D5185m	60 0 1010 1070 1150 1270 2060 limit/base >25	59 0 886 1045 973 1150 2678 current 4	63 <1 963 1093 964 1205 2862 history1 4	57 1 894 1050 891 1197 2347 history2 6
	Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm ypm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	60 0 1010 1070 1150 1270 2060 limit/base >25	59 0 886 1045 973 1150 2678 current 4 4	63 <1 963 1093 964 1205 2862 history1 4 5	57 1 894 1050 891 1197 2347 history2 6 4
	Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm ypm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	60 0 1010 1070 1150 1270 2060 limit/base >25	59 0 886 1045 973 1150 2678 <u>current</u> 4 <1 3	63 <1 963 1093 964 1205 2862 <u>history1</u> 4 5 <1	57 1 894 1050 891 1197 2347 history2 6 4 2
	Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm VTS	ASTM D5185m ASTM D5185m	60 0 1010 1070 1150 1270 2060 limit/base >25 >20 limit/base	59 0 886 1045 973 1150 2678 current 4 <1 3	63 <1 963 1093 964 1205 2862 history1 4 5 <1 history1	57 1 894 1050 891 1197 2347 history2 6 4 2 history2
	Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ypm ypm ppm p	ASTM D5185m ASTM D5185m	60 0 1010 1070 1150 2060 <b>limit/base</b> >25 >20 <b>limit/base</b> >4 >20	59 0 886 1045 973 1150 2678 current 4 <1 3	63 <1 963 1093 964 1205 2862 history1 4 5 <1 *1 0.9	57 1 894 1050 891 1197 2347 history2 6 4 2 history2 0.9
	Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm vTTS	ASTM D5185m ASTM D5185m	60 0 1010 1070 1150 2060 <b>limit/base</b> >25 >20 <b>limit/base</b> >4 >20	59 0 886 1045 973 1150 2678 <b>current</b> 4 <1 3 <b>current</b> 0.6 7.0	63 <1 963 1093 964 1205 2862 <u>history1</u> 4 5 <1 <u>history1</u> 0.9 8.6	57 1 894 1050 891 1197 2347 history2 6 4 2 history2 0.9 9.2
	Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm vTTS	ASTM D5185m ASTM D5185m	60 0 1010 1070 1150 1270 2060 imit/base >25 >20 imit/base >20 >4 >20 >30	59 0 886 1045 973 1150 2678 <u>current</u> 4 <1 3 <u>current</u> 0.6 7.0 19.9	63 <1 963 1093 964 1205 2862 history1 4 5 <1 history1 0.9 8.6 21.2	57 1 894 1050 891 1197 2347 history2 6 4 2 history2 0.9 9.2 21.1

### 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.

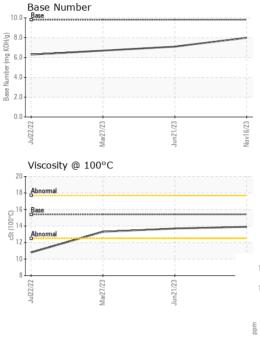
#### Fluid Condition

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



# **OIL ANALYSIS REPORT**

VISUAL



		VISUAL	·	memou	iiiiii/base	Current	Thistory I	TIStory2
		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
52	- 53							
1.03	Nov16/23	Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
-	N N		scalar	*Visual	NORML	NORML	NORML	NORML
		Emulsified Water	scalar	*Visual	>0.2	NEG	NEG	NEG
		Free Water	scalar	*Visual		NEG	NEG	NEG
		FLUID PROPE		method	limit/base	current	history1	history2
		Visc @ 100°C	cSt	ASTM D445	15.4	13.9	13.7	13.3
		GRAPHS						
		Ferrous Alloys						
22	2	iron						
21/23		100- chromium						
-	j	80						
		Ē 60						
		40						
		20						
		2/22		Jun21/23	6/23			
		Jul22/22 Mar27/23		Jun2	Nov16/23			
		Non-ferrous Meta	ls					
		120 T						
		100- copper lead						
		management tin						
		80						
		E 60						
		40						
		20						
		0			-			
		Jul22/22		Jun21/23	Nov16/23			
		2 2		E C	N			
		Ju[22/22 Mar27/23		7	2			
		Viscosity @ 100°C	2	7	2	Base Number		
		Viscosity @ 100°C	2	<b>,</b>	10.0	Base Number		
		Viscosity @ 100°C	2		10.0			
		Viscosity @ 100°C	C		10.0			
		Viscosity @ 100°C	2		10.0			
		Viscosity @ 100°C	2		10.0			
		Viscosity @ 100°C			10.0			
		Viscosity @ 100°C	C		0.01 8.0.4 0.0 KOH(d) 6.0.4 0.0 get			
		Viscosity @ 100°C			10.0 (0)(0)(0) (0)(0)(0)(0)(0)(0)(0)(0)(0)(0)(0)(0)(0)(			
		Viscosity @ 100°C			10.0 (0,0)HOX (0,0)HOX (0,0) (0,0) (0,0) (0,0) (0,0) (0,0) (0,0)	Base		
		Viscosity @ 100°C			10.0 (0,0)HOX (0,0)HOX (0,0) (0,0) (0,0) (0,0) (0,0) (0,0) (0,0)	Base	at (11/2)	
		Viscosity @ 100°C		L	10.0 (0)(0)(0)(0)(0)(0)(0)(0)(0)(0)(0)(0)(0)(	Base	52/1/2mm	
	l aboratory	Viscosity @ 100°C		Jun21/23	10.0 8.0- 10.0 KON (0) 100 Kon	Base 2017		
	Laboratory Sample No.	Viscosity @ 100°C	501 Madis	egilgung son Ave., Ca	10.0 (a)HOX But is august in the second seco	Base 2017	EC//ZUM ironmental - 415	- Michigan Ea
	Laboratory Sample No. Lab Number	Viscosity @ 100°C	501 Madis Received	son Ave., Ca	10.0 8.0- 10.0 KON (0) 100 Kon	Base 2017	ironmental - 415	- Michigan Ea 6200 Elmridg
	Sample No.	Viscosity @ 100°C	501 Madis	son Ave., Ca 2 20 N 2 21 N	10.0 ())HOX But argument 4.0 ())HOX But argument 4.0 () ()HOX But argument 4.0 () () ()HOX But argument 4.0 () () () () () () () () () () () () ()	Base 2017	ironmental - 415	<b>- Michigan Ea</b> 6200 Elmridg ing Heights, N
tificate L2367	Sample No. Lab Number	Viscosity @ 100°C	501 Madis Received Diagnose	son Ave., Ca 2 20 N 2 21 N	10.0 ())HOX 000 10.0 ())HOX 000 10.0 ())HOX 000 10.0 () () () () () () () () () ()	Base 2017	<b>ironmental - 415</b> Sterl	

Submitted By: Frank Wolak Page 2 of 2