

## **OIL ANALYSIS REPORT**

Sample Rating Trend



MACK 812100

Diesel Engine

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

	GAL)	Feb202	Apr2023	Jun2023 Ar	192023	
SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		GFL0086260	GFL0086247	GFL0057649
Sample Date		Client Info		30 Aug 2023	19 Jun 2023	20 Apr 2023
Machine Age	hrs	Client Info		5362	4956	0
Oil Age	hrs	Client Info		5362	4956	4518
Oil Changed		Client Info		N/A	N/A	N/A
Sample Status				NORMAL	NORMAL	NORMAL
CONTAMINAT	ION	method	limit/base	current	history1	history2
Fuel		WC Method	>3.0	<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	>120	12	11	18
Chromium	ppm	ASTM D5185m	>20	<1	<1	<1
Nickel	ppm	ASTM D5185m	>5	<1	<1	0
Titanium	ppm	ASTM D5185m	>2	<1	<1	0
Silver	ppm	ASTM D5185m	>2	0	<1	0
Aluminum	ppm	ASTM D5185m	>20	<1	0	0
Lead	ppm	ASTM D5185m	>40	<1	1	<1
Copper	ppm	ASTM D5185m	>330	2	2	5
Tin	ppm	ASTM D5185m	>15	<1	<1	<1
Vanadium	ppm	ASTM D5185m		<1	0	0
Cadmium	ppm	ASTM D5185m		0	<1	0
ADDITIVES		method	limit/base	current	history1	history2
-			0	13	13	10
Boron	ppm	ASTM D5185m	0	13	15	10
Boron Barium	ppm ppm	ASTM D5185m ASTM D5185m		0	4	0
Barium	ppm	ASTM D5185m	0 60	0	4	0
Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m	0 60	0 68	4 63	0 62
Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	0 60 0	0 68 <1	4 63 <1	0 62 <1
Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 60 0 1010	0 68 <1 902	4 63 <1 850	0 62 <1 761
Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 60 0 1010 1070	0 68 <1 902 1156	4 63 <1 850 1105	0 62 <1 761 1004
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 60 0 1010 1070 1150 1270	0 68 <1 902 1156 979	4 63 <1 850 1105 929	0 62 <1 761 1004 879
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	0 60 0 1010 1070 1150 1270	0 68 <1 902 1156 979 1254	4 63 <1 850 1105 929 1169	0 62 <1 761 1004 879 1090 2424
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 60 0 1010 1070 1150 1270 2060	0 68 <1 902 1156 979 1254 3391	4 63 <1 850 1105 929 1169 3041	0 62 <1 761 1004 879 1090 2424
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 60 0 1010 1070 1150 1270 2060	0 68 <1 902 1156 979 1254 3391 current	4 63 <1 850 1105 929 1169 3041 history1	0 62 <1 761 1004 879 1090 2424 history2
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b> ASTM D5185m	0 60 0 1010 1070 1150 1270 2060 limit/base >25	0 68 <1 902 1156 979 1254 3391 current 5	4 63 <1 850 1105 929 1169 3041 history1 3	0 62 <1 761 1004 879 1090 2424 history2 4
Barium Molybdenum 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 <b>method</b> ASTM D5185m	0 60 0 1010 1070 1150 1270 2060 limit/base >25	0 68 <1 902 1156 979 1254 3391 current 5 2	4 63 <1 850 1105 929 1169 3041 history1 3 2	0 62 <1 761 1004 879 1090 2424 history2 4 0 1
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm ypm	ASTM D5185m ASTM D5185m	0 60 0 1010 1070 1150 1270 2060 <i>limit/base</i> >25 >20	0 68 <1 902 1156 979 1254 3391 <u>current</u> 5 2 3	4 63 <1 850 1105 929 1169 3041 <u>history1</u> 3 2 2	0 62 <1 761 1004 879 1090 2424 history2 4 0 1
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm ypm	ASTM D5185m ASTM D5185m	0 60 0 1010 1070 1150 1270 2060 <i>limit/base</i> >25 >20 <i>limit/base</i>	0 68 <1 902 1156 979 1254 3391 current 5 2 3 3	4 63 <1 850 1105 929 1169 3041 history1 3 2 2 2 history1	0 62 <1 761 1004 879 1090 2424 history2 4 0 1 history2
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm ypm ppm p	ASTM D5185m ASTM D5185m	0 60 0 1010 1070 1150 1270 2060 <b>imit/base</b> >25 >20 <b>imit/base</b> >20	0 68 <1 902 1156 979 1254 3391 <u>current</u> 5 2 3 3 <u>current</u> 0.5	4 63 <1 850 1105 929 1169 3041 history1 3 2 2 2 history1 0.6	0 62 <1 761 1004 879 1090 2424 history2 4 0 1 history2 0.7
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration	<pre>ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm</pre>	ASTM D5185m ASTM D7844 *ASTM D7624	0 60 0 1010 1070 1150 1270 2060 <b>imit/base</b> >25 >20 <b>imit/base</b> >20	0 68 <1 902 1156 979 1254 3391 <u>current</u> 5 2 3 3 <u>current</u> 0.5 7.4	4 63 <1 850 1105 929 1169 3041 <b>history1</b> 3 2 2 2 <b>history1</b> 0.6 7.6	0 62 <1 761 1004 879 1090 2424 history2 4 0 1 history2 0.7 8.5 20.3
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	<pre>ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm</pre>	ASTM D5185m ASTM D5185m	0 60 1010 1070 1150 1270 2060 <b>Imit/base</b> >25 -20 <b>Imit/base</b> >20 >30 <b>Imit/base</b>	0 68 <1 902 1156 979 1254 3391 <u>current</u> 5 2 3 <u>current</u> 0.5 7.4 18.4	4 63 <1 850 1105 929 1169 3041 history1 3 2 2 2 history1 0.6 7.6 19.3	0 62 <1 761 1004 879 1090 2424 history2 4 0 1 history2 0.7 8.5

# 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.

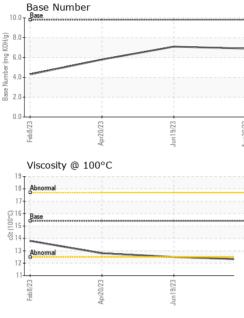
### Fluid Condition

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		method	limit/base	current	nistory i	nistory2
		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
Jun 19/23 +		Debris	scalar	*Visual	NONE	NONE	NONE	NONE
	Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE	
	Appearance	scalar	*Visual	NORML	NORML	NORML	NORML	
-	Aug3	Odor	scalar	*Visual	NORML	NORML	NORML	NORML
		Emulsified Water	scalar	*Visual	>0.2	NEG	NEG	NEG
		Free Water	scalar	*Visual		NEG	NEG	NEG
		FLUID PROPI	ERTIES	method	limit/base	current	history1	history2
		Visc @ 100°C	cSt	ASTM D445	15.4	12.3	12.5	12.8
		GRAPHS						
		Ferrous Alloys						
5		40 iron						
19/	57/61UDC	35 - nickel						
_		30						
		E <sup>25</sup> 20						
		15						
		10-						
		5-						
		0		~				
		Feb 8/23 Apr20/23		Jun 19/23	Aug30/23			
		Non-ferrous Meta	alc	η	Au			
			315					
		14- copper						
		12 tin						
		10						
		<u>ة</u> 8-						
		6						
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	2	2	Witterformation and	and the property of the party o				
			January 1997					
		23 10		2	/23			
		6eb8/23		Jun 19/2.	lug30/23			
		Viscosity @ 100°	С	Jun 19/23	Aug30/23	Base Number		
		Viscosity @ 100°	С	Jun 19/2.	EZ/0EBnW	Base Number		
		Viscosity @ 100°	C	.2/61mJ	10.0-	Base Number		
		Viscosity @ 100°	С	Jun19/2	10.0-	Base Number Base		
		Viscosity @ 100°	c	Jun19/2	10.0-	Base Number Base		
		Viscosity @ 100°	С	Jun19/2	10.0-	Base Number		
		Viscosity @ 100°	C	Jun19/2	10.0 - (6) HO X (0) H	Base Number		
		Viscosity @ 100°	c	Jun 19/2	0.0 8.0 HOX H(d) 6.0 get	Base Number		
		Viscosity @ 100°	C		10.0- (b)(HOX) 000 000 000 000 000 000 000			
		Viscosity @ 100°	c		10.0- (b)(HOX) 000 000 000 000 000 000 000		2018/2017	
	Laboratory Sample No. Lab Number Unique Number Test Package	Viscosity @ 100° Viscosity @ 100° Abnormal		son Ave., Ca i : 01 s ed : 01 s	10.0 (B)(N)(B) (B)(N)(B)(B) (B)(B)(B)(B)(B)(B)(B)(B)(B)(B)(B)(B)(B)(	Еверия 1990 1990 1990 1990 1990 1990 1990 199	vironmental - ( 6905 F	

Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012)

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