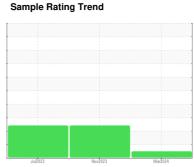


# **OIL ANALYSIS REPORT**

ODT



NORMAL



## Machine Id SS0156 Component

**Diesel Engine** 

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

## DIAGNOSIS

### Recommendation

Resample at the next service interval to monitor. ( Customer Sample Comment: Sample only )

#### Wear

All component wear rates are normal.

## Contamination

There is no indication of any contamination in the oil.

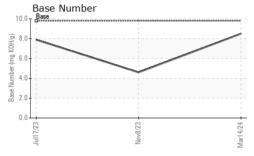
#### **Fluid Condition**

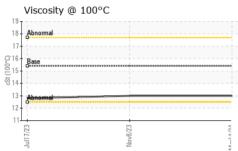
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

Sample Number   Client Info   GFL0116270   GFL0094863   GFL007750   Sample Date   Client Info   14 Mar 2024   08 Nov 2023   17 Jul 2023   17 Jul 2023   18   3124   3081   3124   3081   3081   3124   3124   312	GAL)		Ju	12023	Nov2023 Mar20	124	
Sample Date	SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
Machine Age   hrs   Client Info   67   43   43   45   60	Sample Number		Client Info		GFL0116270	GFL0094863	GFL0077502
Oil Age         hrs         Client Info         67         43         0           Oil Changed Sample Status         Client Info         Not Changd ABNORMAL         Not Changd ABNORMAL         Changed ABNORMAL         ABNORMAL <th< td=""><td>Sample Date</td><td></td><td>Client Info</td><td></td><td>14 Mar 2024</td><td>08 Nov 2023</td><td>17 Jul 2023</td></th<>	Sample Date		Client Info		14 Mar 2024	08 Nov 2023	17 Jul 2023
Dil Changed   Client Info   Not Changd   NORMAL   ABNORMAL   AB	Machine Age	hrs	Client Info		3148	3124	3081
CONTAMINATION   method   limit/base   current   history1   history2	Oil Age	hrs	Client Info		67	43	0
CONTAMINATION	Oil Changed		Client Info		Not Changd	Not Changd	Changed
Fuel	Sample Status				NORMAL	ABNORMAL	ABNORMAL
Water Glycol         WC Method         >0.2         NEG         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >100         19         21         48           Chromium         ppm         ASTM D5185m         >20         10         10         22           Nickel         ppm         ASTM D5185m         >4         0         0         <1           Silver         ppm         ASTM D5185m         >4         0         0         <1           Silver         ppm         ASTM D5185m         >3         0         0         0           Aluminum         ppm         ASTM D5185m         >20         7         8         18           Lead         ppm         ASTM D5185m         >40         0         <1         <1         1           Copper         ppm         ASTM D5185m         >330         <1         <1         <1         <1         <1           Vanadium         ppm         ASTM D5185m         >15         0         <1         <1         <1         <1         <1         <1	CONTAMINAT	TION	method	limit/base	current	history1	history2
WEAR METALS	Fuel		WC Method	>5	<1.0	<1.0	<1.0
WEAR METALS	Water		WC Method	>0.2	NEG	NEG	NEG
Chromium	Glycol		WC Method		NEG	NEG	NEG
Chromium         ppm         ASTM D5185m         >20         10         10         22           Nickel         ppm         ASTM D5185m         >4         0         0         <1	WEAR METAL	_S	method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>100	19	21	48
Titanium         ppm         ASTM D5185m         1         1         4           Silver         ppm         ASTM D5185m         >3         0         0         0           Aluminum         ppm         ASTM D5185m         >20         7         8         18           Lead         ppm         ASTM D5185m         >40         0         <1         <1           Copper         ppm         ASTM D5185m         >330         <1         <1         2           Tin         ppm         ASTM D5185m         >15         0         <1         <1         2           Vanadium         ppm         ASTM D5185m         >15         0         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1	Chromium	ppm	ASTM D5185m	>20	10	10	22
Silver	Nickel	ppm	ASTM D5185m	>4	0	0	<1
Aluminum	Titanium	ppm	ASTM D5185m		1	1	4
Lead         ppm         ASTM D5185m         >40         0         <1         <1           Copper         ppm         ASTM D5185m         >330         <1         <1         2           Tin         ppm         ASTM D5185m         >15         0         <1         <1           Vanadium         ppm         ASTM D5185m         <1         0         <1         <1           Cadmium         ppm         ASTM D5185m         0         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         11         16         22           Barium         ppm         ASTM D5185m         0         0         0         0           Molybdenum         ppm         ASTM D5185m         0         48         46         24           Manganese         ppm         ASTM D5185m         0         <1         <1         1           Magnesium         ppm         ASTM D5185m         1010         719         687         369           Calcium         ppm         ASTM D5185m         1070         1339 <t< td=""><td>Silver</td><td>ppm</td><td>ASTM D5185m</td><td>&gt;3</td><td>-</td><td></td><td></td></t<>	Silver	ppm	ASTM D5185m	>3	-		
Copper         ppm         ASTM D5185m         >330         <1         <1         2           Tin         ppm         ASTM D5185m         >15         0         <1	Aluminum	ppm	ASTM D5185m	>20	7	8	<b>18</b>
Tin	Lead	ppm			0	<1	
Vanadium         ppm         ASTM D5185m         <1         0         <1           Cadmium         ppm         ASTM D5185m         0         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         11         16         22           Barium         ppm         ASTM D5185m         0         0         0         0           Molybdenum         ppm         ASTM D5185m         0         48         46         24           Manganese         ppm         ASTM D5185m         0         <1         <1         1           Magnesium         ppm         ASTM D5185m         1010         719         687         369           Calcium         ppm         ASTM D5185m         1070         1339         1384         1979           Phosphorus         ppm         ASTM D5185m         1270         1147         1206         1153           Sulfur         ppm         ASTM D5185m         2060         3716         3308         4210           CONTAMINANTS         method         limit/base         current         <	Copper	ppm	ASTM D5185m	>330	<1		2
Cadmium         ppm         ASTM D5185m         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         11         16         22           Barium         ppm         ASTM D5185m         0         0         0         0           Molybdenum         ppm         ASTM D5185m         0         48         46         24           Manganese         ppm         ASTM D5185m         0         <1	Tin	ppm		>15			
ADDITIVES	Vanadium	ppm	ASTM D5185m				
Boron         ppm         ASTM D5185m         0         11         16         22           Barium         ppm         ASTM D5185m         0         0         0         0           Molybdenum         ppm         ASTM D5185m         60         48         46         24           Manganese         ppm         ASTM D5185m         0         <1         <1         1           Magnesium         ppm         ASTM D5185m         1010         719         687         369           Calcium         ppm         ASTM D5185m         1070         1339         1384         1979           Phosphorus         ppm         ASTM D5185m         1150         972         1009         925           Zinc         ppm         ASTM D5185m         1270         1147         1206         1153           Sulfur         ppm         ASTM D5185m         2060         3716         3308         4210           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >20         2         26         44           Sodium         ppm         ASTM D5185m	Cadmium	ppm	ASTM D5185m		0	0	0
Barium         ppm         ASTM D5185m         0         0         0         0           Molybdenum         ppm         ASTM D5185m         60         48         46         24           Manganese         ppm         ASTM D5185m         0         <1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum         ppm         ASTM D5185m         60         48         46         24           Manganese         ppm         ASTM D5185m         0         <1         <1         1           Magnesium         ppm         ASTM D5185m         1010         719         687         369           Calcium         ppm         ASTM D5185m         1070         1339         1384         1979           Phosphorus         ppm         ASTM D5185m         1150         972         1009         925           Zinc         ppm         ASTM D5185m         1270         1147         1206         1153           Sulfur         ppm         ASTM D5185m         2060         3716         3308         4210           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         22         26         44           Sodium         ppm         ASTM D5185m         >20         2         5         5           INFRA-RED         method         limit/base         current         history1         history2           Soot %         *6 **ASTM D7844         >3	Boron	ppm	ASTM D5185m	0		16	22
Manganese         ppm         ASTM D5185m         0         <1         <1         1           Magnesium         ppm         ASTM D5185m         1010         719         687         369           Calcium         ppm         ASTM D5185m         1070         1339         1384         1979           Phosphorus         ppm         ASTM D5185m         1150         972         1009         925           Zinc         ppm         ASTM D5185m         1270         1147         1206         1153           Sulfur         ppm         ASTM D5185m         2060         3716         3308         4210           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         22         26         44           Sodium         ppm         ASTM D5185m         >20         2         5         5           Potassium         ppm         ASTM D5185m         >20         2         5         5           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7624 <td>Barium</td> <td>ppm</td> <td>ASTM D5185m</td> <td>0</td> <td>0</td> <td></td> <td>0</td>	Barium	ppm	ASTM D5185m	0	0		0
Magnesium         ppm         ASTM D5185m         1010         719         687         369           Calcium         ppm         ASTM D5185m         1070         1339         1384         1979           Phosphorus         ppm         ASTM D5185m         1150         972         1009         925           Zinc         ppm         ASTM D5185m         1270         1147         1206         1153           Sulfur         ppm         ASTM D5185m         2060         3716         3308         4210           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         22         △ 26         △ 44           Sodium         ppm         ASTM D5185m         3         4         5           Potassium         ppm         ASTM D5185m         >20         2         5         5           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7624         >20         6.4         10.6         8.9           Sulfation         Abs/:nm         *ASTM D7415	Molybdenum	ppm	ASTM D5185m	60	48		
Calcium         ppm         ASTM D5185m         1070         1339         1384         1979           Phosphorus         ppm         ASTM D5185m         1150         972         1009         925           Zinc         ppm         ASTM D5185m         1270         1147         1206         1153           Sulfur         ppm         ASTM D5185m         2060         3716         3308         4210           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         22         ▲ 26         ▲ 44           Sodium         ppm         ASTM D5185m         >20         2         5         5           Potassium         ppm         ASTM D5185m         >20         2         5         5           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.1         0.5         0.1           Nitration         Abs/.1mm         *ASTM D7415         >30         17.1         25.9         18.3           FLUID DEGRADATION <td< td=""><td>Manganese</td><td>ppm</td><td></td><td></td><td></td><td></td><td></td></td<>	Manganese	ppm					
Phosphorus         ppm         ASTM D5185m         1150         972         1009         925           Zinc         ppm         ASTM D5185m         1270         1147         1206         1153           Sulfur         ppm         ASTM D5185m         2060         3716         3308         4210           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         22         ▲ 26         ▲ 44           Sodium         ppm         ASTM D5185m         >20         2         5         5           Potassium         ppm         ASTM D5185m         >20         2         5         5           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.1         0.5         0.1           Nitration         Abs/cm         *ASTM D7624         >20         6.4         10.6         8.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         17.1         25.9         18.3           FLUID DEGRADATION         <	-				_		
Zinc         ppm         ASTM D5185m         1270         1147         1206         1153           Sulfur         ppm         ASTM D5185m         2060         3716         3308         4210           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         22         ▲ 26         ▲ 44           Sodium         ppm         ASTM D5185m         3         4         5           Potassium         ppm         ASTM D5185m         >20         2         5         5           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.1         0.5         0.1           Nitration         Abs/cm         *ASTM D7624         >20         6.4         10.6         8.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         17.1         25.9         18.3           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm		ppm					
Sulfur         ppm         ASTM D5185m         2060         3716         3308         4210           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         22         ▲ 26         ▲ 44           Sodium         ppm         ASTM D5185m         3         4         5           Potassium         ppm         ASTM D5185m         >20         2         5         5           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.1         0.5         0.1           Nitration         Abs/cm         *ASTM D7624         >20         6.4         10.6         8.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         17.1         25.9         18.3           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         12.7         21.8         13.3	•				-		
CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         22         ▲ 26         ▲ 44           Sodium         ppm         ASTM D5185m         3         4         5           Potassium         ppm         ASTM D5185m         >20         2         5         5           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.1         0.5         0.1           Nitration         Abs/cm         *ASTM D7624         >20         6.4         10.6         8.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         17.1         25.9         18.3           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         12.7         21.8         13.3	-						
Silicon         ppm         ASTM D5185m         >25         22         ▲ 26         ▲ 44           Sodium         ppm         ASTM D5185m         3         4         5           Potassium         ppm         ASTM D5185m         >20         2         5         5           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.1         0.5         0.1           Nitration         Abs/cm         *ASTM D7624         >20         6.4         10.6         8.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         17.1         25.9         18.3           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         12.7         21.8         13.3					3716	3308	
Sodium         ppm         ASTM D5185m         3         4         5           Potassium         ppm         ASTM D5185m         >20         2         5         5           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.1         0.5         0.1           Nitration         Abs/cm         *ASTM D7624         >20         6.4         10.6         8.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         17.1         25.9         18.3           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         12.7         21.8         13.3		NTS					· ·
Potassium         ppm         ASTM D5185m         >20         2         5         5           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.1         0.5         0.1           Nitration         Abs/cm         *ASTM D7624         >20         6.4         10.6         8.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         17.1         25.9         18.3           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         12.7         21.8         13.3				>25			
INFRA-RED		ppm					
Soot %         %         *ASTM D7844 >3         0.1         0.5         0.1           Nitration         Abs/cm         *ASTM D7624 >20         6.4         10.6         8.9           Sulfation         Abs/.1mm         *ASTM D7415 >30         17.1         25.9         18.3           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414 >25         12.7         21.8         13.3		ppm	ASTM D5185m	>20	2	5	
Nitration         Abs/cm         *ASTM D7624         >20         6.4         10.6         8.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         17.1         25.9         18.3           FLUID DEGRADATION method limit/base current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         12.7         21.8         13.3	INFRA-RED		method	limit/base	current	history1	history2
Sulfation         Abs/.1mm         *ASTM D7415         >30         17.1         25.9         18.3           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         12.7         21.8         13.3	Soot %	%	*ASTM D7844	>3	0.1		
FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 12.7 21.8 13.3	Nitration	Abs/cm	*ASTM D7624	>20	6.4	10.6	8.9
Oxidation Abs/.1mm *ASTM D7414 >25 <b>12.7</b> 21.8 13.3	Sulfation	Abs/.1mm	*ASTM D7415	>30	17.1	25.9	18.3
	FLUID DEGRA	DATION	method	limit/base	current	history1	history2
Base Number (BN)         mg KOH/g         ASTM D2896         9.8         8.5         4.6         7.9	Oxidation	Abs/.1mm	*ASTM D7414	>25	12.7	21.8	13.3
	Base Number (BN)	mg KOH/g	ASTM D2896	9.8	8.5	4.6	7.9



# **OIL ANALYSIS REPORT**

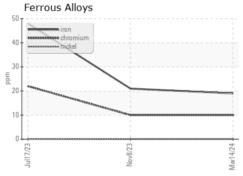


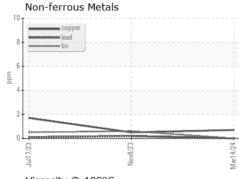


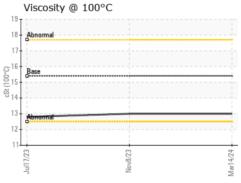
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML	NORML
<b>Emulsified Water</b>	scalar	*Visual	>0.2	NEG	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG

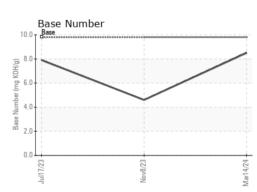
FLUID PROPI	ERTIES	method				history2
Visc @ 100°C	cSt	ASTM D445	15.4	13.0	13.0	12.8

## **GRAPHS**













Certificate L2367

Laboratory Sample No.

: GFL0116270 Lab Number : 06122969 Unique Number : 10937120 Test Package : FLEET

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 Received : 19 Mar 2024 **Tested** : 20 Mar 2024

Diagnosed : 21 Mar 2024 - Don Baldridge

GFL Environmental - 625 - Harrison Hauling

4102 Industrial Pkwy Harrison, MI US 48625

Contact: RON TROJANEK ront@northerna1.com T: (231)624-0372

To discuss this sample report, contact Customer Service at 1-800-237-1369.

\* - Denotes test methods that are outside of the ISO 17025 scope of accreditation.

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