

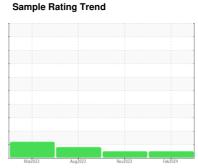
# **OIL ANALYSIS REPORT**



Area (QB18889)
Machine Id 913022
Component

Diesel Engine

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

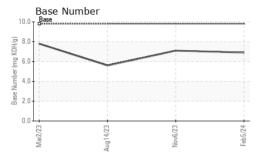
### **Fluid Condition**

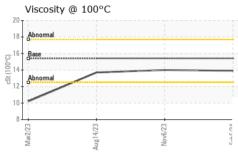
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

Sample Number   Client Info   GFL0104557   GFL0092615   GFL0082635   Sample Date   Client Info   05 Feb 2024   06 Nov 2023   14 Aug 2023   14 Aug 2023   14 Aug 2023   1818   1818   1818   1818   1819   1818   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1819   1			Mar202	3 Aug2023	Nov2023 F	eb2024	
Sample Date   Client Info   05 Feb 2024   06 Nov 2023   14 Aug 2023   Machine Age   hrs   Client Info   610   605   610   605   610   Changed   Not Changed   Client Info   Changed   Not Changed   NoRMAL   ABNORMAL   ABNORMAL   ABNORMAL   ABNORMAL   CONTAMINATION   method   Imitibase   current   mistory1   mistory2   Mater   WC Method   So.2   NEG	SAMPLE INFO	RMATION	method	limit/base	current	history1	history2
Machine Age   hrs   Client Info   610   605   610   610   605   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610   610	Sample Number		Client Info		GFL0104557	GFL0092615	GFL0082537
Oil Age         hrs         Client Info         610         605         610           Oil Changed Sample Status         Client Info         Changed Not Changed Not Changed Changed Changed Normal Normal Normal Normal Normal ABNORMAL         ABNORMAL ABNORMAL ABNORMAL ABNORMAL ABNORMAL Normal N	Sample Date		Client Info		05 Feb 2024	06 Nov 2023	14 Aug 2023
Oil Changed Sample Status         Client Info         Changed NORMAL         Not Changed ABNORMAL         Changed ABNORMAL         Changed ABNORMAL         ABSORMER	Machine Age	hrs	Client Info		3032	2423	1818
CONTAMINATION	Oil Age	hrs	Client Info		610	605	610
CONTAMINATION	Oil Changed		Client Info		Changed	Not Changd	Changed
Fuel	Sample Status				_		ABNORMAL
Water Glycol         WC Method         >0.2         NEG           Wall         ASTM DFR         ASTM DF	CONTAMINA	ATION	method	limit/base	current	history1	history2
WEAR METALS	Fuel		WC Method	>3.0	<1.0	<1.0	<1.0
WEAR METALS	Water		WC Method	>0.2	NEG	NEG	NEG
Irron	Glycol		WC Method		NEG	NEG	NEG
Chromium         ppm         ASTM D5185m         >20         <1         <1         2           Nickel         ppm         ASTM D5185m         >5         3         2         ▲ 10           Titanium         ppm         ASTM D5185m         >2         0         <1	WEAR META	ALS	method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>120	14	18	52
Titanium	Chromium	ppm	ASTM D5185m	>20	<1	<1	2
Silver	Nickel	ppm	ASTM D5185m	>5	3	2	<u> </u>
Silver	Titanium	ppm	ASTM D5185m	>2	0	<1	0
Aluminum	Silver		ASTM D5185m	>2	<1	0	0
Lead	Aluminum		ASTM D5185m	>20	2	1	2
Copper         ppm         ASTM D5185m         >330         14         30         69           Tin         ppm         ASTM D5185m         >15         1         1         3           Vanadium         ppm         ASTM D5185m         0         0         0         <1					<1	<1	<1
Tin							
Vanadium         ppm         ASTM D5185m         0         0         <1           Cadmium         ppm         ASTM D5185m         0         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         3         0         6           Barium         ppm         ASTM D5185m         0         0         0         0           Molybdenum         ppm         ASTM D5185m         60         61         60         70           Manganese         ppm         ASTM D5185m         0         <1         <1         2           Magnesium         ppm         ASTM D5185m         1070         1071         1059         1202           Phosphorus         ppm         ASTM D5185m         1150         1072         947         998           Zinc         ppm         ASTM D5185m         1270         1335         1273         1292           Sulfur         ppm         ASTM D5185m         2060         2798         2398         2545           CONTAMINANTS         method         limit/base         current         his							
Cadmium         ppm         ASTM D5185m         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         3         0         6           Barium         ppm         ASTM D5185m         0         0         0         0           Molybdenum         ppm         ASTM D5185m         0         <1				710			
ADDITIVES							
Boron	ADDITIVES	1-1-	method	limit/base	current	history1	history2
Barium         ppm         ASTM D5185m         0         0         0         0           Molybdenum         ppm         ASTM D5185m         60         61         60         70           Manganese         ppm         ASTM D5185m         0         <1	Boron	ppm	ASTM D5185m	0	3	0	6
Molybdenum         ppm         ASTM D5185m         60         61         60         70           Manganese         ppm         ASTM D5185m         0         <1         <1         2           Magnesium         ppm         ASTM D5185m         1010         997         951         1063           Calcium         ppm         ASTM D5185m         1070         1071         1059         1202           Phosphorus         ppm         ASTM D5185m         1150         1072         947         998           Zinc         ppm         ASTM D5185m         1270         1335         1273         1292           Sulfur         ppm         ASTM D5185m         2060         2798         2398         2545           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         4         5         14           Sodium         ppm         ASTM D5185m         >20         1         3         0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         *6 *ASTM D7624         >20	Barium		ASTM D5185m	0		0	0
Manganese         ppm         ASTM D5185m         0         <1         <1         2           Magnesium         ppm         ASTM D5185m         1010         997         951         1063           Calcium         ppm         ASTM D5185m         1070         1071         1059         1202           Phosphorus         ppm         ASTM D5185m         1150         1072         947         998           Zinc         ppm         ASTM D5185m         1270         1335         1273         1292           Sulfur         ppm         ASTM D5185m         2060         2798         2398         2545           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         4         5         14           Sodium         ppm         ASTM D5185m         >20         1         3         0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.7         0.8         1.1           Nitration         Abs/cm         *ASTM D7	Molybdenum		ASTM D5185m	60	61	60	70
Magnesium         ppm         ASTM D5185m         1010         997         951         1063           Calcium         ppm         ASTM D5185m         1070         1071         1059         1202           Phosphorus         ppm         ASTM D5185m         1150         1072         947         998           Zinc         ppm         ASTM D5185m         1270         1335         1273         1292           Sulfur         ppm         ASTM D5185m         2060         2798         2398         2545           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         4         5         14           Sodium         ppm         ASTM D5185m         >20         1         3         0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7624         >20         9.2         9.3         10.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         20.8         21.5         22.5           FLUID DEGRADATION         *ASTM D7					_		
Calcium         ppm         ASTM D5185m         1070         1071         1059         1202           Phosphorus         ppm         ASTM D5185m         1150         1072         947         998           Zinc         ppm         ASTM D5185m         1270         1335         1273         1292           Sulfur         ppm         ASTM D5185m         2060         2798         2398         2545           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         4         5         14           Sodium         ppm         ASTM D5185m         >20         1         3         0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         "ASTM D7624         >20         9.2         9.3         10.9           Sulfation         Abs/.1mm         "ASTM D7415         >30         20.8         21.5         22.5           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation <td>•</td> <td></td> <td></td> <td></td> <th></th> <td></td> <td>1063</td>	•						1063
Phosphorus         ppm         ASTM D5185m         1150         1072         947         998           Zinc         ppm         ASTM D5185m         1270         1335         1273         1292           Sulfur         ppm         ASTM D5185m         2060         2798         2398         2545           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         4         5         14           Sodium         ppm         ASTM D5185m         >20         1         3         0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.7         0.8         1.1           Nitration         Abs/cm         *ASTM D7624         >20         9.2         9.3         10.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         20.8         21.5         22.5           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs							
Zinc         ppm         ASTM D5185m         1270         1335         1273         1292           Sulfur         ppm         ASTM D5185m         2060         2798         2398         2545           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         4         5         14           Sodium         ppm         ASTM D5185m         >20         1         3         0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.7         0.8         1.1           Nitration         Abs/cm         *ASTM D7624         >20         9.2         9.3         10.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         20.8         21.5         22.5           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         17.6         18.1         20.4					-		
Sulfur         ppm         ASTM D5185m         2060         2798         2398         2545           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         4         5         14           Sodium         ppm         ASTM D5185m         4         4         7           Potassium         ppm         ASTM D5185m         >20         1         3         0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.7         0.8         1.1           Nitration         Abs/cm         *ASTM D7624         >20         9.2         9.3         10.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         20.8         21.5         22.5           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         17.6         18.1         20.4	•						
CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         4         5         14           Sodium         ppm         ASTM D5185m         4         4         7           Potassium         ppm         ASTM D5185m         >20         1         3         0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.7         0.8         1.1           Nitration         Abs/cm         *ASTM D7624         >20         9.2         9.3         10.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         20.8         21.5         22.5           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         17.6         18.1         20.4							
Sodium         ppm         ASTM D5185m         4         4         7           Potassium         ppm         ASTM D5185m         >20         1         3         0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.7         0.8         1.1           Nitration         Abs/cm         *ASTM D7624         >20         9.2         9.3         10.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         20.8         21.5         22.5           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         17.6         18.1         20.4	CONTAMINA		method	limit/base		history1	history2
Sodium         ppm         ASTM D5185m         4         4         7           Potassium         ppm         ASTM D5185m         >20         1         3         0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.7         0.8         1.1           Nitration         Abs/cm         *ASTM D7624         >20         9.2         9.3         10.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         20.8         21.5         22.5           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         17.6         18.1         20.4		-			4		,
Potassium         ppm         ASTM D5185m         >20         1         3         0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.7         0.8         1.1           Nitration         Abs/cm         *ASTM D7624         >20         9.2         9.3         10.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         20.8         21.5         22.5           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         17.6         18.1         20.4							
Soot %         %         *ASTM D7844 >4         0.7         0.8         1.1           Nitration         Abs/cm         *ASTM D7624 >20         9.2         9.3         10.9           Sulfation         Abs/.1mm         *ASTM D7415 >30         20.8         21.5         22.5           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414 >25         17.6         18.1         20.4				>20			
Nitration         Abs/cm         *ASTM D7624         >20         9.2         9.3         10.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         20.8         21.5         22.5           FLUID DEGRADATION method limit/base current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         17.6         18.1         20.4	INFRA-RED		method	limit/base	current	history1	history2
Nitration         Abs/cm         *ASTM D7624         >20         9.2         9.3         10.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         20.8         21.5         22.5           FLUID DEGRADATION method limit/base current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         17.6         18.1         20.4	Soot %	%	*ASTM D7844	>4	0.7	0.8	1.1
Sulfation         Abs/.1mm         *ASTM D7415         >30         20.8         21.5         22.5           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         17.6         18.1         20.4							
Oxidation Abs/.1mm *ASTM D7414 >25 <b>17.6</b> 18.1 20.4							
	FLUID DEGR	ADATION	method	limit/base	current	history1	history2
	Oxidation	Abs/.1mm	*ASTM D7414	>25	17.6	18.1	20.4
					6.9	7.1	5.6



# **OIL ANALYSIS REPORT**

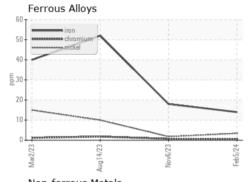


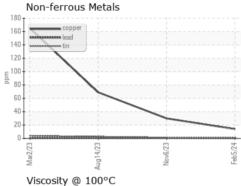


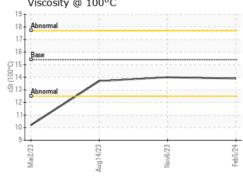
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	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

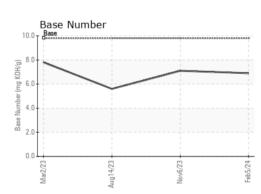
FLUID PROP	ERTIES	method				history2
Visc @ 100°C	cSt	ASTM D445	15.4	13.9	14.0	13.7

## **GRAPHS**













Laboratory Sample No. Lab Number : 06105086

: GFL0104557 Unique Number : 10903316 Test Package : FLEET

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 Received : 29 Feb 2024 **Tested** Diagnosed

: 01 Mar 2024 : 01 Mar 2024 - Wes Davis

GFL Environmental - 947 - WB Horicon HC

N7296 County Rd V Horicon, WI US 53032

Contact: Tim Kieffer tim.kieffer@gflenv.com

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)

T: (608)219-0288