

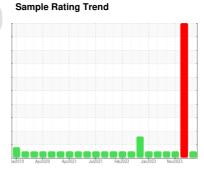
# **OIL ANALYSIS REPORT**

(YA144040) 3805C

Component

**Natural Gas Engine** 

PETRO CANADA DURON GEO LD 15W40 (46 GAL)





## DIAGNOSIS

### Recommendation

Resample at the next service interval to monitor.

All component wear rates are normal.

### Contamination

No evidence of coolant present in the oil. There is no indication of any contamination in the oil.

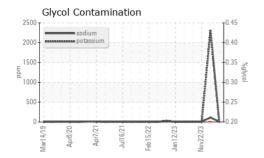
## **Fluid Condition**

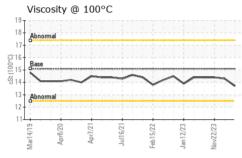
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

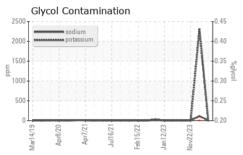
Sample Number         Client Info         GFL0090003         GFL0099824         2FL0099813         GFL0099814         28 Dec 2023         22 Nov 2023           Machine Age         hrs         Client Info         12 Feb 2024         28 Dec 2023         22 Nov 2023           Machine Age         hrs         Client Info         600         100         10090           Oil Age         hrs         Client Info         Changed         Not Changd         N/A           Oil Changed         Client Info         Changed         Not Changd         N/A           Water         Wc Method         -0.1         NEG         NEG         NEG           WEAR METALS         method         limit base         current         history1         history2           Water         Wc Method         -0.1         NEG         NEG         NEG           WEAR METALS         method         limit base         current         history1         history2           Water         Wc Method         -0.1         NEG         NEG         NEG           WEAR METALS         method         limit base         current         history1         history2           Water         ppm         ASTM D5185m         -3         0         0	SAMPLE INFORI	MATION	method	limit/base	current	history1	history2
Sample Date   Client Info   12 Feb 2024   28 Dec 2023   22 Nov 2023					GFL0090003	· ·	GFL0099813
Machine Age         hrs         Client Info         14557         14390         14295           Oil Age         hrs         Client Info         600         100         10090           Oil Changed         Client Info         Changed         Not Changed         N/A           Sample Status         Normal         SEVERE         NORMAL           CONTAMINATION         method         Imitibase         current         history1         history2           Water         WC Method         >0.1         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >50         4         23         5           Chromium         ppm         ASTM D5185m         >4         <1         2         <1           Nickel         ppm         ASTM D5185m         >2         0         A1         0         <1           Silver         ppm         ASTM D5185m         >3         0         0         0         <1           1         0         <1           <1         0         <1         <1 <t< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th></th></t<>							
Oil Age         hrs         Client Info         600         100         10090           Oil Changed Sample Status         Client Info         Changed Nor Cha		hrs					
Oil Changed Sample Status         Client Info         Changed NORMAL         N/A         N/A           CONTAMINATION         method         limit/base         current         history1         history2           Water         WC Method         >0.1         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >50         4         23         5           Chromium         ppm         ASTM D5185m         >4         <1	•		Client Info		600	100	10090
CONTAMINATION         method         limit/base         current         history1         history2           Water         WC Method         >0.1         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >50         4         23         5           Chromium         ppm         ASTM D5185m         >4         <1			Client Info			Not Changd	N/A
Water         WC Method         >0.1         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >50         4         23         5           Chromium         ppm         ASTM D5185m         >4         -1         2         -1           Nickel         ppm         ASTM D5185m         >2         0         1         0           Silver         ppm         ASTM D5185m         >3         0         0         <1					_		NORMAL
WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >50         4         23         5           Chromium         ppm         ASTM D5185m         >4         <1         2         <1           Nickel         ppm         ASTM D5185m         >2         0         1         0           Titanium         ppm         ASTM D5185m         3         0         0         0           Aluminum         ppm         ASTM D5185m         >3         0         0         0           Aluminum         ppm         ASTM D5185m         >9         1         4         3           Lead         ppm         ASTM D5185m         >35         0         176         <1           Tin         ppm         ASTM D5185m         >4         0         13         0           Vanadium         ppm         ASTM D5185m         0         0         0         0           Cadmium         ppm         ASTM D5185m         0         42         13         29           Barium         ppm         ASTM D5185m         50         42         13 <t< th=""><th>CONTAMINAT</th><th>ION</th><th>method</th><th>limit/base</th><th>current</th><th>history1</th><th>history2</th></t<>	CONTAMINAT	ION	method	limit/base	current	history1	history2
Iron	Water		WC Method	>0.1	NEG	NEG	NEG
Chromium         ppm         ASTM D5185m         >4         <1	WEAR METAL	S	method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>50	4	23	5
Titanium         ppm         ASTM D5185m         0         0         <1	Chromium	ppm	ASTM D5185m	>4	<1	2	<1
Silver         ppm         ASTM D5185m         >3         0         0         0           Aluminum         ppm         ASTM D5185m         >9         1         4         3           Lead         ppm         ASTM D5185m         >9         1         4         3           Copper         ppm         ASTM D5185m         >30         0         176         <1	Nickel	ppm	ASTM D5185m	>2	0	<u> </u>	0
Aluminum         ppm         ASTM D5185m         >9         1         4         3           Lead         ppm         ASTM D5185m         >30         0         177         0           Copper         ppm         ASTM D5185m         >35         0         176         <1           Tin         ppm         ASTM D5185m         >4         0         13         0           Vanadium         ppm         ASTM D5185m         0         0         0         0           Cadmium         ppm         ASTM D5185m         0         0         0         0           Boron         ppm         ASTM D5185m         50         42         13         29           Barium         ppm         ASTM D5185m         50         42         13         29           Barium         ppm         ASTM D5185m         5         8         <1         0         0           Molybdenum         ppm         ASTM D5185m         50         42         13         29           Manganese         ppm         ASTM D5185m         50         49         45         52           Manganesium         ppm         ASTM D5185m         780         657	Titanium	ppm	ASTM D5185m		0	0	<1
Lead         ppm         ASTM D5185m         >30         0         177         0           Copper         ppm         ASTM D5185m         >35         0         176         <1	Silver	ppm	ASTM D5185m	>3	0	0	
Copper         ppm         ASTM D5185m         335         0         176         <1	Aluminum	ppm	ASTM D5185m	>9	1	4	3
Tin         ppm         ASTM D5185m         >4         0         13         0           Vanadium         ppm         ASTM D5185m         0         0         0         0           Cadmium         ppm         ASTM D5185m         0         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         50         42         13         29           Barium         ppm         ASTM D5185m         50         42         13         29           Barium         ppm         ASTM D5185m         50         49         45         52           Manganese         ppm         ASTM D5185m         50         49         45         52           Manganese         ppm         ASTM D5185m         500         509         527         603           Calcium         ppm         ASTM D5185m         560         509         527         603           Calcium         ppm         ASTM D5185m         780         657         801         801           Zinc         ppm         ASTM D5185m         20         848	Lead	ppm	ASTM D5185m	>30	0	<u> </u>	0
Vanadium         ppm         ASTM D5185m         0         0         0         0           Cadmium         ppm         ASTM D5185m         0         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         50         42         13         29           Barium         ppm         ASTM D5185m         50         49         45         52           Molybdenum         ppm         ASTM D5185m         50         49         45         52           Manganese         ppm         ASTM D5185m         50         49         45         52           Manganesium         ppm         ASTM D5185m         50         509         527         603           Calcium         ppm         ASTM D5185m         780         557         801         801         801           Zinc         ppm         ASTM D5185m         780         657         801         801         801           Sulfur         ppm         ASTM D5185m         2040         2293         2434         2735           CONTAMINANTS         method         <	Copper	ppm	ASTM D5185m	>35	0	•	
Cadmium         ppm         ASTM D5185m         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         50         42         13         29           Barium         ppm         ASTM D5185m         50         49         45         52           Molybdenum         ppm         ASTM D5185m         50         49         45         52           Manganese         ppm         ASTM D5185m         50         49         45         52           Magnesium         ppm         ASTM D5185m         560         509         527         603           Calcium         ppm         ASTM D5185m         780         557         801         801           Phosphorus         ppm         ASTM D5185m         780         657         801         801           Zinc         ppm         ASTM D5185m         870         848         915         992           Sulfur         ppm         ASTM D5185m         >2040         2293         2434         2735           CONTAMINANTS         method         limit/base         current	Tin	ppm	ASTM D5185m	>4	0	<b>1</b> 3	0
ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         50         42         13         29           Barium         ppm         ASTM D5185m         5         8         <1         0           Molybdenum         ppm         ASTM D5185m         50         49         45         52           Manganese         ppm         ASTM D5185m         0         0         <1         0           Magnesium         ppm         ASTM D5185m         560         509         527         603           Calcium         ppm         ASTM D5185m         780         657         801         801           Phosphorus         ppm         ASTM D5185m         780         657         801         801           Zinc         ppm         ASTM D5185m         870         848         915         992           Sulfur         ppm         ASTM D5185m         2040         2293         2434         2735           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m	Vanadium	ppm	ASTM D5185m		0	0	0
Boron	Cadmium	ppm	ASTM D5185m		0	0	0
Barium         ppm         ASTM D5185m         5         8         <1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum         ppm         ASTM D5185m         50         49         45         52           Manganese         ppm         ASTM D5185m         0         0         <1	Boron	ppm	ASTM D5185m	50	42	13	29
Manganese         ppm         ASTM D5185m         0         0         <1	Barium	ppm	ASTM D5185m	5	8	<1	0
Magnesium         ppm         ASTM D5185m         560         509         527         603           Calcium         ppm         ASTM D5185m         1510         1325         1471         1512           Phosphorus         ppm         ASTM D5185m         780         657         801         801           Zinc         ppm         ASTM D5185m         870         848         915         992           Sulfur         ppm         ASTM D5185m         2040         2293         2434         2735           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >+100         5         9         6           Sodium         ppm         ASTM D5185m         >20         5         2307         2           Glycol         %         *ASTM D5185m         >20         5         2307         2           Glycol         %         *ASTM D2982          0.20            INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7624         >20 <th< th=""><th>Molybdenum</th><th>ppm</th><th>ASTM D5185m</th><th>50</th><th>49</th><th>45</th><th>52</th></th<>	Molybdenum	ppm	ASTM D5185m	50	49	45	52
Calcium         ppm         ASTM D5185m         1510         1325         1471         1512           Phosphorus         ppm         ASTM D5185m         780         657         801         801           Zinc         ppm         ASTM D5185m         870         848         915         992           Sulfur         ppm         ASTM D5185m         2040         2293         2434         2735           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >+100         5         9         6           Sodium         ppm         ASTM D5185m         >+100         5         9         6           Sodium         ppm         ASTM D5185m         >20         5         2307         2           Glycol         %         *ASTM D5185m         >20         5         2307         2           Glycol         %         *ASTM D5282          0.20            INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         0 </th <th>Manganese</th> <th>ppm</th> <th>ASTM D5185m</th> <th>0</th> <th>0</th> <th>&lt;1</th> <th>0</th>	Manganese	ppm	ASTM D5185m	0	0	<1	0
Phosphorus         ppm         ASTM D5185m         780         657         801         801           Zinc         ppm         ASTM D5185m         870         848         915         992           Sulfur         ppm         ASTM D5185m         2040         2293         2434         2735           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >+100         5         9         6           Sodium         ppm         ASTM D5185m         2         114         3           Potassium         ppm         ASTM D5185m         >20         5         2307         2           Glycol         %         *ASTM D2982          0.20            INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         0         0.2         0           Nitration         Abs/:mm         *ASTM D7415         >30         18.7         21.9         19.8           FLUID DEGRADATION         *ASTM D7414         >25         15.7         15.9	Magnesium	ppm	ASTM D5185m	560	509	527	603
Zinc         ppm         ASTM D5185m         870         848         915         992           Sulfur         ppm         ASTM D5185m         2040         2293         2434         2735           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >+100         5         9         6           Sodium         ppm         ASTM D5185m         2         ▲ 114         3           Potassium         ppm         ASTM D5185m         >20         5         ▲ 2307         2           Glycol         %         *ASTM D5185m         >20         5         ▲ 2307         2           Glycol         %         *ASTM D2982          ● 0.20            INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         0         0.2         0           Nitration         Abs/cm         *ASTM D7415         >30         18.7         21.9         19.8           FLUID DEGRADATION         *ASTM D7414         >25         15.7         15.9	Calcium	ppm	ASTM D5185m	1510	1325	1471	1512
Sulfur         ppm         ASTM D5185m         2040         2293         2434         2735           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >+100         5         9         6           Sodium         ppm         ASTM D5185m         2         114         3           Potassium         ppm         ASTM D5185m         >20         5         2307         2           Glycol         %         *ASTM D2982          0.20            INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         0         0.2         0           Nitration         Abs/cm         *ASTM D7624         >20         7.8         9.0         8.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.7         21.9         19.8           FLUID DEGRADATION method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         15.7         15.9	Phosphorus	ppm	ASTM D5185m	780	657	801	801
CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >+100         5         9         6           Sodium         ppm         ASTM D5185m         2         114         3           Potassium         ppm         ASTM D5185m         >20         5         2307         2           Glycol         %         *ASTM D2982          0.20            INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         0         0.2         0           Nitration         Abs/cm         *ASTM D7624         >20         7.8         9.0         8.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.7         21.9         19.8           FLUID DEGRADATION method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         15.7         15.9         16.7	Zinc	ppm	ASTM D5185m	870	848	915	992
Silicon         ppm         ASTM D5185m         >+100         5         9         6           Sodium         ppm         ASTM D5185m         2         114         3           Potassium         ppm         ASTM D5185m         >20         5         2307         2           Glycol         %         *ASTM D2982          0.20            INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         0         0.2         0           Nitration         Abs/cm         *ASTM D7624         >20         7.8         9.0         8.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.7         21.9         19.8           FLUID DEGRADATION method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         15.7         15.9         16.7	Sulfur	ppm	ASTM D5185m	2040	2293	2434	2735
Sodium         ppm         ASTM D5185m         2         ▲ 114         3           Potassium         ppm         ASTM D5185m         >20         5         ▲ 2307         2           Glycol         %         *ASTM D2982          ● 0.20            INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         0         0.2         0           Nitration         Abs/cm         *ASTM D7624         >20         7.8         9.0         8.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.7         21.9         19.8           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         15.7         15.9         16.7	CONTAMINAN	TS	method	limit/base	current	history1	history2
Potassium         ppm         ASTM D5185m         >20         5         △ 2307         2           Glycol         %         *ASTM D2982          ♠ 0.20            INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         0         0.2         0           Nitration         Abs/cm         *ASTM D7624         >20         7.8         9.0         8.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.7         21.9         19.8           FLUID DEGRADATION method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         15.7         15.9         16.7		ppm	ASTM D5185m	>+100	5		
Soot %	Sodium	ppm	ASTM D5185m		2	<u> </u>	3
INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         0         0.2         0           Nitration         Abs/cm         *ASTM D7624         >20         7.8         9.0         8.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.7         21.9         19.8           FLUID DEGRADATION method limit/base current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         15.7         15.9         16.7	Potassium		ASTM D5185m	>20	5	<u>^</u> 2307	2
Soot %         %         *ASTM D7844         0         0.2         0           Nitration         Abs/cm         *ASTM D7624         >20         7.8         9.0         8.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.7         21.9         19.8           FLUID DEGRADATION method limit/base current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         15.7         15.9         16.7	Glycol	%	*ASTM D2982			0.20	
Nitration         Abs/cm         *ASTM D7624         >20         7.8         9.0         8.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.7         21.9         19.8           FLUID DEGRADATION method limit/base current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         15.7         15.9         16.7	INFRA-RED		method	limit/base	current	history1	history2
Sulfation         Abs/.1mm         *ASTM D7415         >30         18.7         21.9         19.8           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         15.7         15.9         16.7	Soot %	%	*ASTM D7844		0	0.2	0
FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     15.7     15.9     16.7	Nitration	Abs/cm	*ASTM D7624	>20	7.8	9.0	8.9
Oxidation Abs/.1mm *ASTM D7414 >25 <b>15.7</b> 15.9 16.7	Sulfation	Abs/.1mm	*ASTM D7415	>30	18.7	21.9	19.8
	FLUID DEGRA	DATION	method	limit/base	current	history1	history2
	Oxidation	Abs/.1mm	*ASTM D7414	>25	15.7	15.9	16.7
. , , ,	Base Number (BN)	mg KOH/g	ASTM D2896	10.2			7.3



# **OIL ANALYSIS REPORT**



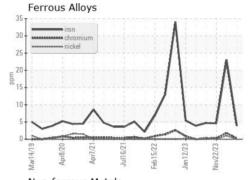


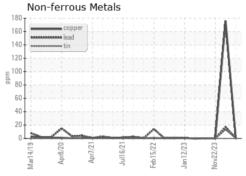


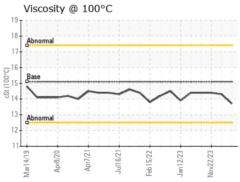
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML	NORML
<b>Emulsified Water</b>	scalar	*Visual	>0.1	NEG	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG

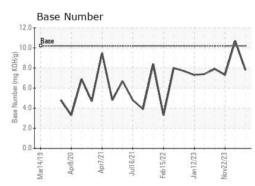
FLUID PROPERTIES		method				history2
Visc @ 100°C	cSt	ASTM D445	15.1	13.7	14.3	14.4

## **GRAPHS**













Certificate L2367

Laboratory Sample No. Lab Number : 06088562

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : GFL0090003

Received

**Tested** Unique Number : 10876007 Test Package : FLEET

: 14 Feb 2024 : 15 Feb 2024 : 15 Feb 2024 - Jonathan Hester Diagnosed

4621 Marracco Drive Hope Mills, NC US 28348 Contact: Robert Carter

T: (910)596-1170

robert.carter@gflenv.com

GFL Environmental - 018 - Fayetteville

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)

F: