

# **PROBLEM SUMMARY**

Sample Rating Trend

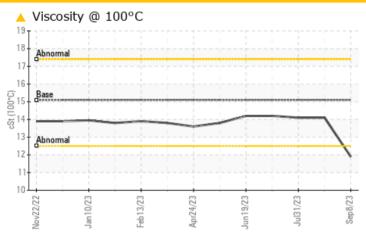
VISCOSITY

Machine Id 933022

Component **Natural Gas Engine** 

PETRO CANADA DURON GEO LD 15W40 (--- GAL)

# **COMPONENT CONDITION SUMMARY**



## RECOMMENDATION

No corrective action is recommended at this time. Resample at the next service interval to monitor.

PROBLEMATIC TEST RESULTS							
Sample Status				ATTENTION	NORMAL	NORMAL	
Visc @ 100°C	cSt	ASTM D445	15.1	<u> </u>	14.1	14.1	

Customer Id: GFL836 Sample No.: GFL0090662 Lab Number: 05951039 Test Package: FLEET

To manage this report scan the QR code

To discuss the diagnosis or test data: Jonathan Hester +1 919-379-4092 x4092 jhester@wearcheckusa.com

To change component or sample information: Customer Service +1 1-800-237-1369 customerservice@wearcheck.com

# **RECOMMENDED ACTIONS**

There are no recommended actions for this sample.

### HISTORICAL DIAGNOSIS

## 14 Aug 2023 Diag: Wes Davis

NORMAL



Resample at the next service interval to monitor. All component wear rates are normal. There is no indication of any contamination in the oil. The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.



#### 31 Jul 2023 Diag: Wes Davis

NORMAL



Resample at the next service interval to monitor. All component wear rates are normal. There is no indication of any contamination in the oil. The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.



### 08 Jul 2023 Diag: Wes Davis

NORMAL



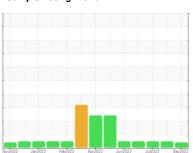
Resample at the next service interval to monitor. All component wear rates are normal. There is no indication of any contamination in the oil. The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.





# **OIL ANALYSIS REPORT**

Sample Rating Trend



VISCOSITY



Machine Id **933022** 

Component

Natural Gas Engine

PETRO CANADA DURON GEO LD 15W40 (--- GAL)

# **DIAGNOSIS**

### Recommendation

No corrective action is recommended at this time. 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.

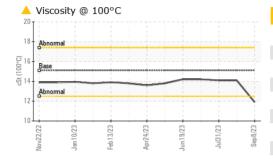
#### ▲ Fluid Condition

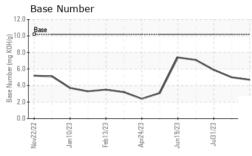
The oil viscosity is lower than normal. The BN result indicates that there is suitable alkalinity remaining in the oil. Confirm oil type.

Magnesium         ppm         ASTM D5185m         560         874         582         544           Calcium         ppm         ASTM D5185m         1510         1327         1517         1443           Phosphorus         ppm         ASTM D5185m         780         715         690         732	GAL)		Nov2022	Jan 2023 Feb 2023	Apr2023 Jun2023 Jul2023	Sep 2023	
Sample Date   Client Info   2375   2207   2120	SAMPLE INFORI	MATION	method	limit/base	current	history1	history2
Machine Age         hrs         Client Info         0         1200         0           Oil Age         Client Info         0         1200         0           Oil Changed         Client Info         Not Changd         Changed         Not Changd           Sample Status         Image: Client Info         Not Changd         Changed         NoRMAL           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >50         31         9         10           Chromium         ppm         ASTM D5185m         >24         <1	Sample Number		Client Info		GFL0090662	GFL0087186	GFL0087223
Oil Age         hrs         Client Info         Not Changed         1         1	Sample Date		Client Info		08 Sep 2023	14 Aug 2023	31 Jul 2023
Oil Changed   Sample Status   Client Info   Not Changed   Not Changed   Normal   N	Machine Age	hrs	Client Info		2375	2207	2120
WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >50         31         9         10           Chromium         ppm         ASTM D5185m         >4         <1         <1         <1           Nickel         ppm         ASTM D5185m         >2         <1         0         <1           Silver         ppm         ASTM D5185m         >2         <1         0         <1           Aluminum         ppm         ASTM D5185m         >9         5         4         3           Lead         ppm         ASTM D5185m         >30         6         2         2         2           Copper         ppm         ASTM D5185m         >30         6         2         2         1         1         1           Vanadium         ppm         ASTM D5185m	Oil Age	hrs	Client Info		0	1200	0
WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >50         31         9         10           Chromium         ppm         ASTM D5185m         >4         <1         <1         <1           Nickel         ppm         ASTM D5185m         >2         <1         0         <1         0           Titanium         ppm         ASTM D5185m         >3         0         <1         <1         0           Silver         ppm         ASTM D5185m         >3         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         <1         <1         <1         <1         <1         <1         <1<	Oil Changed		Client Info		Not Changd	Changed	Not Changd
Iron	Sample Status				ATTENTION	NORMAL	NORMAL
Chromium         ppm         ASTM D5185m         >4         <1	WEAR METAL	S	method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>50	31	9	10
Description	Chromium	ppm	ASTM D5185m	>4	<1	<1	<1
Silver	Nickel	ppm	ASTM D5185m	>2	<1	0	<1
Aluminum         ppm         ASTM D5185m         >9         5         4         3           Lead         ppm         ASTM D5185m         >30         6         2         2           Copper         ppm         ASTM D5185m         >35         10         5         5           Tin         ppm         ASTM D5185m         >4         2         <1	Titanium	ppm	ASTM D5185m		0	<1	0
Lead	Silver	ppm	ASTM D5185m	>3	0	<1	<1
Copper         ppm         ASTM D5185m         >35         10         5         5           Tin         ppm         ASTM D5185m         >4         2         <1	Aluminum	ppm	ASTM D5185m	>9	5	4	3
Tin	Lead	ppm	ASTM D5185m	>30	6	2	2
Tin         ppm         ASTM D5185m         >4         2         <1         <1           Vanadium         ppm         ASTM D5185m         <1         <1         0           Cadmium         ppm         ASTM D5185m         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         50         7         11         15           Barium         ppm         ASTM D5185m         50         0         0         0           Molybdenum         ppm         ASTM D5185m         50         56         52         52           Manganese         ppm         ASTM D5185m         50         874         582         544           Calcium         ppm         ASTM D5185m         780         715         690         732           Zinc         ppm         ASTM D5185m         780         715         690         732           Zinc         ppm         ASTM D5185m         870         948         903         887           Sulfur         ppm         ASTM D5185m         2040         2725         2673         2196 <td>Copper</td> <td>ppm</td> <td>ASTM D5185m</td> <td>&gt;35</td> <th>10</th> <td>5</td> <td>5</td>	Copper	ppm	ASTM D5185m	>35	10	5	5
Cadmium         ppm         ASTM D5185m         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         50         7         11         15           Barium         ppm         ASTM D5185m         50         0         0         0           Molybdenum         ppm         ASTM D5185m         50         56         52         52           Manganese         ppm         ASTM D5185m         0         5         1         <1		ppm	ASTM D5185m	>4	2	<1	<1
ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         50         7         11         15           Barium         ppm         ASTM D5185m         5         0         0         0           Molybdenum         ppm         ASTM D5185m         50         56         52         52           Manganese         ppm         ASTM D5185m         560         874         582         544           Calcium         ppm         ASTM D5185m         780         715         690         732           Zinc         ppm         ASTM D5185m         780         715         690         732           Zinc         ppm         ASTM D5185m         70         948         903         887           Sulfur         ppm         ASTM D5185m         2040         2725         2673         2196           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >+100         96         16         16           Sodium         ppm         ASTM D5185m         >2	Vanadium	ppm	ASTM D5185m		<1	<1	0
Boron         ppm         ASTM D5185m         50         7         11         15           Barium         ppm         ASTM D5185m         5         0         0         0           Molybdenum         ppm         ASTM D5185m         50         56         52         52           Manganese         ppm         ASTM D5185m         50         56         52         52           Magnesium         ppm         ASTM D5185m         560         874         582         544           Calcium         ppm         ASTM D5185m         560         874         582         544           Calcium         ppm         ASTM D5185m         780         715         690         732           Zinc         ppm         ASTM D5185m         870         948         903         887           Sulfur         ppm         ASTM D5185m         2040         2725         2673         2196           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >+100         96         16         16         6           Sodium         ppm         ASTM D5185m	Cadmium	ppm	ASTM D5185m		0	0	0
Barium         ppm         ASTM D5185m         5         0         0         0           Molybdenum         ppm         ASTM D5185m         50         56         52         52           Manganese         ppm         ASTM D5185m         0         5         1         <1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum         ppm         ASTM D5185m         50         56         52         52           Manganese         ppm         ASTM D5185m         0         5         1         <1           Magnesium         ppm         ASTM D5185m         560         874         582         544           Calcium         ppm         ASTM D5185m         1510         1327         1517         1443           Phosphorus         ppm         ASTM D5185m         780         715         690         732           Zinc         ppm         ASTM D5185m         870         948         903         887           Sulfur         ppm         ASTM D5185m         2040         2725         2673         2196           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >+100         96         16         16         16           Sodium         ppm         ASTM D5185m         >20         8         2         4           INFRA-RED         method         limit/base         current         history1         history2           Soot %         "ASTM D7844	Boron	ppm	ASTM D5185m			11	
Manganese         ppm         ASTM D5185m         0         5         1         <1           Magnesium         ppm         ASTM D5185m         560         874         582         544           Calcium         ppm         ASTM D5185m         1510         1327         1517         1443           Phosphorus         ppm         ASTM D5185m         780         715         690         732           Zinc         ppm         ASTM D5185m         870         948         903         887           Sulfur         ppm         ASTM D5185m         2040         2725         2673         2196           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >+100         96         16         16           Sodium         ppm         ASTM D5185m         >+100         96         16         4         0           Potassium         ppm         ASTM D5185m         >20         8         2         4           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D762	Barium	ppm	ASTM D5185m		0		0
Magnesium         ppm         ASTM D5185m         560         874         582         544           Calcium         ppm         ASTM D5185m         1510         1327         1517         1443           Phosphorus         ppm         ASTM D5185m         780         715         690         732           Zinc         ppm         ASTM D5185m         870         948         903         887           Sulfur         ppm         ASTM D5185m         2040         2725         2673         2196           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >+100         96         16         16           Sodium         ppm         ASTM D5185m         >+20         8         2         4           INFRA-RED         method         limit/base         current         history1         history2           Soot %         *ASTM D7844         0.1         0         0.1           Nitration         Abs/cm         *ASTM D7624         >20         12.0         10.5         9.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         2	Molybdenum	ppm				52	52
Calcium         ppm         ASTM D5185m         1510         1327         1517         1443           Phosphorus         ppm         ASTM D5185m         780         715         690         732           Zinc         ppm         ASTM D5185m         870         948         903         887           Sulfur         ppm         ASTM D5185m         2040         2725         2673         2196           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >+100         96         16         16           Sodium         ppm         ASTM D5185m         >+100         96         4         0           Potassium         ppm         ASTM D5185m         >20         8         2         4           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         0.1         0         0.1           Nitration         Abs/cm         *ASTM D7624         >20         12.0         10.5         9.4           Sulfation         Abs/.1mm         *ASTM D7415	Manganese	ppm	ASTM D5185m		5		
Phosphorus         ppm         ASTM D5185m         780         715         690         732           Zinc         ppm         ASTM D5185m         870         948         903         887           Sulfur         ppm         ASTM D5185m         2040         2725         2673         2196           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >+100         96         16         16           Sodium         ppm         ASTM D5185m         >+100         96         4         0           Potassium         ppm         ASTM D5185m         >20         8         2         4           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         0.1         0         0.1           Nitration         Abs/cm         *ASTM D7624         >20         12.0         10.5         9.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         24.2         20.8         19.5           FLUID DEGRADATION         method         limit/base </td <td>Magnesium</td> <td>ppm</td> <td></td> <td></td> <th></th> <td></td> <td>544</td>	Magnesium	ppm					544
Zinc         ppm         ASTM D5185m         870         948         903         887           Sulfur         ppm         ASTM D5185m         2040         2725         2673         2196           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >+100         96         16         16           Sodium         ppm         ASTM D5185m         >20         8         2         4           Potassium         ppm         ASTM D5185m         >20         8         2         4           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         0.1         0         0.1           Nitration         Abs/cm         *ASTM D7624         >20         12.0         10.5         9.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         24.2         20.8         19.5           FLUID DEGRADATION method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414	Calcium	ppm	ASTM D5185m				
Sulfur         ppm         ASTM D5185m         2040         2725         2673         2196           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >+100         96         16         16           Sodium         ppm         ASTM D5185m         6         4         0           Potassium         ppm         ASTM D5185m         >20         8         2         4           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         0.1         0         0.1           Nitration         Abs/cm         *ASTM D7624         >20         12.0         10.5         9.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         24.2         20.8         19.5           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         23.0         18.3         16.5	Phosphorus	ppm	ASTM D5185m				
CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >+100         96         16         16           Sodium         ppm         ASTM D5185m         6         4         0           Potassium         ppm         ASTM D5185m         >20         8         2         4           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         0.1         0         0.1           Nitration         Abs/cm         *ASTM D7624         >20         12.0         10.5         9.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         24.2         20.8         19.5           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         23.0         18.3         16.5	Zinc	ppm	ASTM D5185m	870	948		
Silicon         ppm         ASTM D5185m         >+100         96         16         16           Sodium         ppm         ASTM D5185m         6         4         0           Potassium         ppm         ASTM D5185m         >20         8         2         4           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         0.1         0         0.1           Nitration         Abs/cm         *ASTM D7624         >20         12.0         10.5         9.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         24.2         20.8         19.5           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         23.0         18.3         16.5	Sulfur	ppm	ASTM D5185m	2040	2725	2673	2196
Sodium         ppm         ASTM D5185m         6         4         0           Potassium         ppm         ASTM D5185m         >20         8         2         4           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         0.1         0         0.1           Nitration         Abs/cm         *ASTM D7624         >20         12.0         10.5         9.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         24.2         20.8         19.5           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         23.0         18.3         16.5	CONTAMINAN	TS	method	limit/base	current	history1	history2
Potassium         ppm         ASTM D5185m         >20         8         2         4           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         0.1         0         0.1           Nitration         Abs/cm         *ASTM D7624         >20         12.0         10.5         9.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         24.2         20.8         19.5           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         23.0         18.3         16.5	Silicon	ppm	ASTM D5185m	>+100	96	16	16
INFRA-RED	Sodium	ppm	ASTM D5185m		6	4	0
Soot %         %         *ASTM D7844         0.1         0         0.1           Nitration         Abs/cm         *ASTM D7624         >20         12.0         10.5         9.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         24.2         20.8         19.5           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         23.0         18.3         16.5	Potassium	ppm	ASTM D5185m	>20	8	2	4
Nitration         Abs/cm         *ASTM D7624         >20         12.0         10.5         9.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         24.2         20.8         19.5           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         23.0         18.3         16.5	INFRA-RED		method	limit/base	current	history1	history2
Sulfation         Abs/.1mm         *ASTM D7415         >30         24.2         20.8         19.5           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         23.0         18.3         16.5	Soot %	%	*ASTM D7844		0.1	0	0.1
FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D7414>2523.018.316.5	Nitration	Abs/cm	*ASTM D7624	>20	12.0	10.5	9.4
Oxidation Abs/.1mm *ASTM D7414 >25 23.0 18.3 16.5	Sulfation	Abs/.1mm	*ASTM D7415	>30	24.2	20.8	19.5
	FLUID DEGRAD	DATION	method	limit/base	current	history1	history2
Base Number (BN) mg KOH/g ASTM D2896 10.2 4.7 5.0 5.9	Oxidation	Abs/.1mm	*ASTM D7414	>25	23.0	18.3	16.5
	Base Number (BN)	mg KOH/g	ASTM D2896	10.2	4.7	5.0	5.9



# **OIL ANALYSIS REPORT**

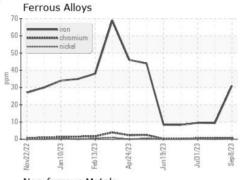


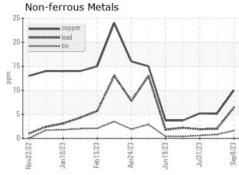


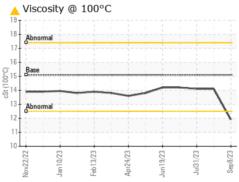
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual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

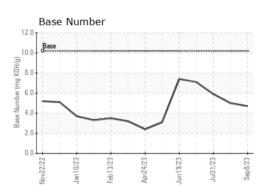
FLUID PROPE	ERITES	method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445	15.1	<b>11.9</b>	14.1	14.1

### **GRAPHS**













Laboratory Sample No. Lab Number

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

: GFL0090662 : 05951039 Unique Number : 10646998 Test Package : FLEET

Received : 14 Sep 2023 Diagnosed : 19 Sep 2023 Diagnostician : Jonathan Hester GFL Environmental - 836 - Kansas City Hauling 7801 East Truman Road

Kansas City, MO US 64126 Contact: Robert Hart

rhart@gflenv.com T: (580)461-1509

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)