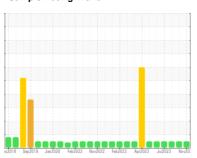


# **OIL ANALYSIS REPORT**

Sample Rating Trend



NORMAL



726037-310027

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.

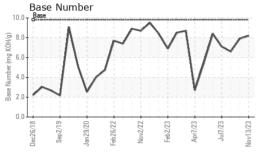
### **Fluid Condition**

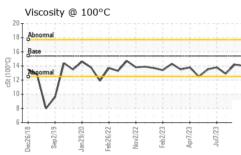
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

| ,  |  | ac2018 Sep20   | 19 Jan 2020 Feb 2022 I  | Nov2022 Feb2023 Apr2023 Jul   | 2023 Nov20;   |   |
|--|--|--|---|---|---|---|
| SAMPLE INFORM  | ATION  | method   | limit/base  | current   | history1  | history2  |
| Sample Number  |  | Client Info  |   | GFL0099970  | GFL0095139  | GFL0090734  |
| Sample Date  |  | Client Info  |   | 13 Nov 2023   | 12 Oct 2023   | 13 Sep 2023   |
| Machine Age  | hrs  | Client Info  |   | 14652   | 14468   | 14286   |
| Oil Age  | hrs  | Client Info  |   | 0   | 600   | 600   |
| Oil Changed  |  | Client Info  |   | Not Changd  | Changed   | Changed   |
| Sample Status  |  |  |   | NORMAL  | NORMAL  | NORMAL  |
| CONTAMINATI  | ON   | method   | limit/base  | current   | history1  | history2  |
| Fuel   |  | WC Method  | >5  | <1.0  | <1.0  | <1.0  |
| Glycol   |  | WC Method  |   | NEG   | NEG   | NEG   |
| WEAR METALS  | S  | method   | limit/base  | current   | history1  | history2  |
| Iron   | ppm  | ASTM D5185m  | >110  | 4   | 12  | 50  |
| Chromium   | ppm  | ASTM D5185m  | >4  | <1  | <1  | <1  |
| Nickel   | ppm  | ASTM D5185m  | >2  | 0   | <1  | <1  |
| Titanium   | ppm  | ASTM D5185m  |   | 0   | 0   | 0   |
| Silver   | ppm  | ASTM D5185m  | >2  | 0   | 0   | 0   |
| Aluminum   | ppm  | ASTM D5185m  | >25   | 2   | 2   | 0   |
| Lead   | ppm  | ASTM D5185m  | >45   | 0   | <1  | 0   |
| Copper   | ppm  | ASTM D5185m  | >85   | <1  | <1  | 10  |
| Tin  | ppm  | ASTM D5185m  | >4  | 0   | <1  | 2   |
| Vanadium   | ppm  | ASTM D5185m  |   | 0   | 0   | 0   |
| Cadmium  | ppm  | ASTM D5185m  |   | 0   | 0   | 0   |
|  |  |  |   |   |   |   |
| ADDITIVES  |  | method   | limit/base  | current   | history1  | history2  |
| ADDITIVES<br>Boron   | ppm  |  | limit/base  | current<br>5  | history1  | history2<br>2   |
|  | ppm  | ASTM D5185m  |   |   |   |   |
| Boron  | • •  | ASTM D5185m  | 0   | 5   | 2   | 2   |
| Boron<br>Barium  | ppm  | ASTM D5185m<br>ASTM D5185m   | 0<br>0<br>60  | 5<br>0  | 2   | 2   |
| Boron<br>Barium<br>Molybdenum  | ppm  | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m  | 0<br>0<br>60  | 5<br>0<br>55  | 2<br>0<br>63  | 2<br>0<br>58  |
| Boron<br>Barium<br>Molybdenum<br>Manganese   | ppm<br>ppm   | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m   | 0<br>0<br>60<br>0   | 5<br>0<br>55<br><1  | 2<br>0<br>63<br>0   | 2<br>0<br>58<br><1  |
| Boron Barium Molybdenum Manganese Magnesium  | ppm<br>ppm<br>ppm  | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m  | 0<br>0<br>60<br>0<br>1010   | 5<br>0<br>55<br><1<br>882   | 2<br>0<br>63<br>0<br>932  | 2<br>0<br>58<br><1<br>971   |
| Boron Barium Molybdenum Manganese Magnesium Calcium  | ppm<br>ppm<br>ppm<br>ppm   | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m   | 0<br>0<br>60<br>0<br>1010<br>1070   | 5<br>0<br>55<br><1<br>882<br>991  | 2<br>0<br>63<br>0<br>932<br>1065  | 2<br>0<br>58<br><1<br>971<br>1079   |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus   | ppm<br>ppm<br>ppm<br>ppm<br>ppm                                    | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m  | 0<br>0<br>60<br>0<br>1010<br>1070<br>1150   | 5<br>0<br>55<br><1<br>882<br>991<br>980   | 2<br>0<br>63<br>0<br>932<br>1065<br>955   | 2<br>0<br>58<br><1<br>971<br>1079<br>1045   |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc  | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm                      | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m   | 0<br>0<br>60<br>0<br>1010<br>1070<br>1150<br>1270   | 5<br>0<br>55<br><1<br>882<br>991<br>980<br>1187   | 2<br>0<br>63<br>0<br>932<br>1065<br>955<br>1236   | 2<br>0<br>58<br><1<br>971<br>1079<br>1045<br>1279   |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur   | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm                      | ASTM D5185m  | 0<br>0<br>60<br>0<br>1010<br>1070<br>1150<br>1270<br>2060   | 5<br>0<br>55<br><1<br>882<br>991<br>980<br>1187<br>2902   | 2<br>0<br>63<br>0<br>932<br>1065<br>955<br>1236<br>3231   | 2<br>0<br>58<br><1<br>971<br>1079<br>1045<br>1279<br>3647   |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN  | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm               | ASTM D5185m  | 0<br>0<br>60<br>0<br>1010<br>1070<br>1150<br>1270<br>2060   | 5<br>0<br>55<br><1<br>882<br>991<br>980<br>1187<br>2902   | 2<br>0<br>63<br>0<br>932<br>1065<br>955<br>1236<br>3231<br>history1   | 2<br>0<br>58<br><1<br>971<br>1079<br>1045<br>1279<br>3647<br>history2   |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon  | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm        | ASTM D5185m  | 0<br>0<br>60<br>0<br>1010<br>1070<br>1150<br>1270<br>2060   | 5<br>0<br>55<br><1<br>882<br>991<br>980<br>1187<br>2902<br>current  | 2<br>0<br>63<br>0<br>932<br>1065<br>955<br>1236<br>3231<br>history1   | 2<br>0<br>58<br><1<br>971<br>1079<br>1045<br>1279<br>3647<br>history2   |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium   | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm | ASTM D5185m  | 0<br>0<br>60<br>0<br>1010<br>1070<br>1150<br>1270<br>2060<br>limit/base   | 5<br>0<br>55<br><1<br>882<br>991<br>980<br>1187<br>2902<br>current<br>3<br>16                                       | 2<br>0<br>63<br>0<br>932<br>1065<br>955<br>1236<br>3231<br>history1<br>6<br>14  | 2<br>0<br>58<br><1<br>971<br>1079<br>1045<br>1279<br>3647<br>history2   |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium   | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm | ASTM D5185m  | 0<br>0<br>60<br>0<br>1010<br>1070<br>1150<br>1270<br>2060<br>limit/base<br>>30  | 5<br>0<br>55<br><1<br>882<br>991<br>980<br>1187<br>2902<br>current<br>3<br>16<br>2                                  | 2<br>0<br>63<br>0<br>932<br>1065<br>955<br>1236<br>3231<br>history1<br>6<br>14  | 2<br>0<br>58<br><1<br>971<br>1079<br>1045<br>1279<br>3647<br>history2<br>13<br>3  |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED   | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm | ASTM D5185m  | 0<br>0<br>60<br>0<br>1010<br>1070<br>1150<br>1270<br>2060<br>limit/base<br>>30  | 5<br>0<br>55<br><1<br>882<br>991<br>980<br>1187<br>2902<br>current<br>3<br>16<br>2                                  | 2<br>0<br>63<br>0<br>932<br>1065<br>955<br>1236<br>3231<br>history1<br>6<br>14<br>3                                   | 2<br>0<br>58<br><1<br>971<br>1079<br>1045<br>1279<br>3647<br>history2   |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot %                                  | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm | ASTM D5185m  method  *ASTM D5185m  ASTM D5185m  ASTM D5185m  ASTM D5185m  ASTM D5185m  ASTM D5185m  ASTM D5185m  | 0<br>0<br>60<br>0<br>1010<br>1070<br>1150<br>1270<br>2060<br>limit/base<br>>30<br>>20<br>limit/base                           | 5<br>0<br>55<br><1<br>882<br>991<br>980<br>1187<br>2902<br>current<br>3<br>16<br>2<br>current<br>0.2                | 2<br>0<br>63<br>0<br>932<br>1065<br>955<br>1236<br>3231<br>history1<br>6<br>14<br>3<br>history1<br>0.3                | 2<br>0<br>58<br><1<br>971<br>1079<br>1045<br>1279<br>3647<br>history2<br>13<br>3<br>1   |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration                        | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm | ASTM D5185m  Method  ASTM D5185m ASTM D7844  *ASTM D7624  *ASTM D76145 | 0<br>0<br>60<br>0<br>1010<br>1070<br>1150<br>1270<br>2060<br>limit/base<br>>30<br>>20<br>limit/base                           | 5<br>0<br>55<br><1<br>882<br>991<br>980<br>1187<br>2902<br>current<br>3<br>16<br>2<br>current<br>0.2<br>7.6         | 2<br>0<br>63<br>0<br>932<br>1065<br>955<br>1236<br>3231<br>history1<br>6<br>14<br>3<br>history1<br>0.3<br>7.9         | 2<br>0<br>58<br><1<br>971<br>1079<br>1045<br>1279<br>3647<br>history2<br>13<br>3<br>1<br>history2<br>0.9<br>9.2                     |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation              | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm | ASTM D5185m  Method  ASTM D5185m ASTM D7844  *ASTM D7624  *ASTM D76145 | 0<br>0<br>0<br>0<br>1010<br>1070<br>1150<br>1270<br>2060<br>limit/base<br>>30<br>>20<br>limit/base<br>>3<br>>20<br>>3         | 5<br>0<br>55<br><1<br>882<br>991<br>980<br>1187<br>2902<br>current<br>3<br>16<br>2<br>current<br>0.2<br>7.6<br>19.3 | 2<br>0<br>63<br>0<br>932<br>1065<br>955<br>1236<br>3231<br>history1<br>6<br>14<br>3<br>history1<br>0.3<br>7.9<br>19.5 | 2<br>0<br>58<br><1<br>971<br>1079<br>1045<br>1279<br>3647<br>history2<br>13<br>3<br>1<br>history2<br>0.9<br>9.2<br>19.1             |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation FLUID DEGRAD | ppm                            | ASTM D5185m  method  ASTM D5185m ASTM D5185m  ASTM D5185m ASTM D5185m  ASTM D5185m  ASTM D5185m  ASTM D5185m  method  *ASTM D7624 *ASTM D7624 *ASTM D7415  method      | 0<br>0<br>0<br>0<br>1010<br>1070<br>1150<br>1270<br>2060<br>limit/base<br>>30<br>>20<br>limit/base<br>>3<br>>20<br>limit/base | 5<br>0<br>55<br><1<br>882<br>991<br>980<br>1187<br>2902<br>current<br>3<br>16<br>2<br>current<br>0.2<br>7.6<br>19.3 | 2<br>0<br>63<br>0<br>932<br>1065<br>955<br>1236<br>3231<br>history1<br>6<br>14<br>3<br>history1<br>0.3<br>7.9<br>19.5 | 2<br>0<br>58<br><1<br>971<br>1079<br>1045<br>1279<br>3647<br>history2<br>13<br>3<br>1<br>history2<br>0.9<br>9.2<br>19.1<br>history2 |



## **OIL ANALYSIS REPORT**

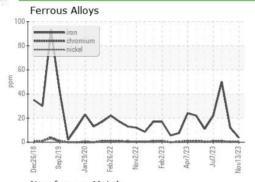


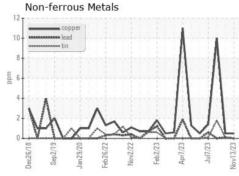


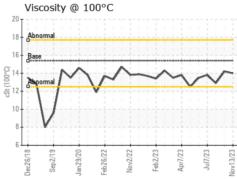
| VISUAL                  |        | method  | limit/base | current | history1 | history2 |
|-------------------------|--------|---------|------------|---------|----------|----------|
| White Metal             | scalar | *Visual | NONE       | NONE    | NONE     | NONE     |
| Yellow Metal            | 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      |

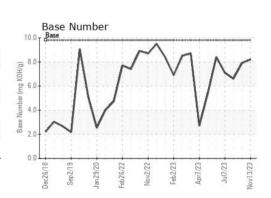
| FLUID PROPERTIES |     | method    |      |      |      | history2 |
|------------------|-----|-----------|------|------|------|----------|
| Visc @ 100°C     | cSt | ASTM D445 | 15.4 | 14.0 | 14.2 | 12.9     |

### **GRAPHS**













Certificate L2367

Laboratory Sample No. Lab Number Unique Number : 10742730 Test Package : FLEET

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : GFL0099970 : 06008968

Received : 15 Nov 2023 Diagnosed : 16 Nov 2023 Diagnostician : Wes Davis

GFL Environmental - 837 - Harrison TS 22820 S State Route 291

Harrisonville, MO US 64701

Contact: BRYAN SWANSON bryanswanson@gflenv.com T:

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: