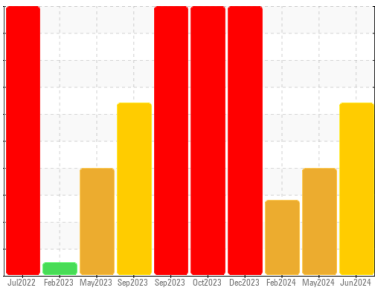
# PROBLEM SUMMARY

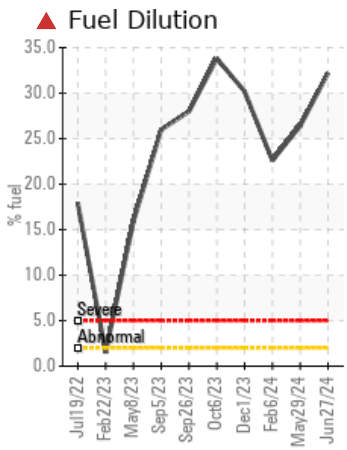
Sample Rating Trend

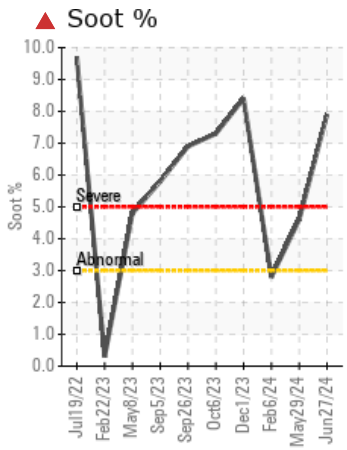


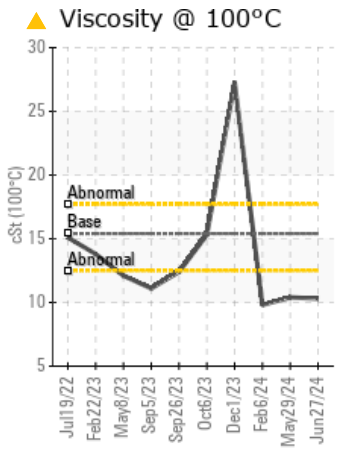
**SOOT**

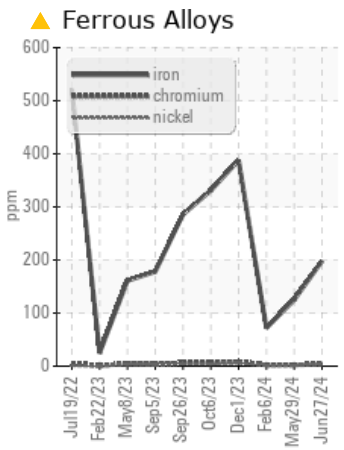
Machine Id
**722011-1169**
Component
**Diesel Engine**
Fluid
**PETRO CANADA DURON SHP 15W40 (24 QTS)**

## COMPONENT CONDITION SUMMARY




## RECOMMENDATION

We advise that you check the fuel injection system. We advise that you check for faulty combustion, plugged air filters, or aftercoolers. Oil and filter change at the time of sampling has been noted. We recommend an early resample to monitor this condition. NOTE: High solids (carbon/soot) in the sample have limited the accuracy of Infra-Red data including Total Base Number (TBN) value.

## PROBLEMATIC TEST RESULTS

| Sample Status | | | | **SEVERE** | SEVERE | SEVERE |
|---|---|---|---|---|---|---|
| Iron | ppm | ASTM D5185m | >100 | ▲ **198** | ▲ 125 | 72 |
| Fuel | % | ASTM D3524 | >2.0 | ▲ **32.2** | ▲ 26.4 | ▲ 22.6 |
| Soot % | % | *ASTM D7844 | >3 | ▲ **7.9** | ▲ 4.6 | 2.8 |
| Base Number (BN) | mg KOH/g | ASTM D2896 | 9.8 | ▲ **0.0** | 6.5 | 8.4 |
| Visc @ 100°C | cSt | ASTM D445 | 15.4 | ▲ **10.3** | ▲ 10.4 | ▲ 9.8 |

**Customer Id:** GFL622
**Sample No.:** GFL0120902
**Lab Number:** 06226031
**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

| Action | Status | Date | Done By | Description |
|---|---|---|---|---|
| Change Fluid | --- | --- | ? | Oil and filter change at the time of sampling has been noted. |
| Change Filter | --- | --- | ? | Oil and filter change at the time of sampling has been noted. |
| Resample | --- | --- | ? | We recommend an early resample to monitor this condition. |
| Alert | --- | --- | ? | NOTE: High solids (carbon/soot) in the sample have limited the accuracy of Infra-Red data including Total Base Number (TBN) value. |
| Check Combustion | --- | --- | ? | We advise that you check for faulty combustion, plugged air filters, or aftercoolers. |
| Check Fuel/injector System | --- | --- | ? | We advise that you check the fuel injection system. |

## HISTORICAL DIAGNOSIS

FUEL

**29 May 2024 Diag: Don Baldridge**

We advise that you check the fuel injection system. We advise that you check for faulty combustion, plugged air filters, or aftercoolers. We recommend that you drain the oil and perform a filter service on this component if not already done. We recommend an early resample to monitor this condition.Cylinder, crank, or cam shaft wear is indicated. There is a high amount of fuel present in the oil. There is an abnormal amount of solids and carbon present in the oil. Fuel is present in the oil and is lowering the viscosity. The oil is no longer serviceable due to the presence of contaminants.

view report

FUEL

**06 Feb 2024 Diag: Wes Davis**

We advise that you check the fuel injection system. The oil change at the time of sampling has been noted. We recommend an early resample to monitor this condition.All component wear rates are normal. There is a high amount of fuel present in the oil. Tests confirm the presence of fuel in the oil. The BN result indicates that there is suitable alkalinity remaining in the oil. Fuel is present in the oil and is lowering the viscosity. The oil is no longer serviceable due to the presence of contaminants.

view report

WEAR

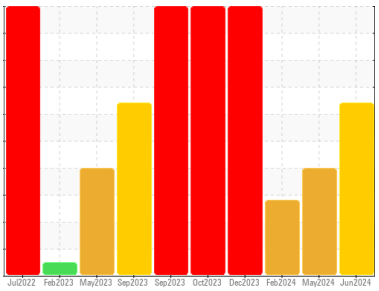
**01 Dec 2023 Diag: Jonathan Hester**

We advise that you check the fuel injection system. We advise that you check for faulty combustion, plugged air filters, or aftercoolers. We recommend that you drain the oil and perform a filter service on this component if not already done. We advise that you inspect for the source(s) of wear. We recommend an early resample to monitor this condition. NOTE: High solids (carbon/soot) in the sample have limited the accuracy of Infra-Red data including Total Base Number (TBN) value.Cylinder, crank, or cam shaft wear is indicated. There is a high amount of fuel present in the oil. There is an abnormal amount of solids and carbon present in the oil. Fuel is present in the oil and is lowering the viscosity. The BN level is low. The oil is no longer serviceable due to the presence of contaminants.

view report

# OIL ANALYSIS REPORT

Sample Rating Trend




**SOOT**

Machine Id
**722011-1169**
Component
**Diesel Engine**
Fluid
**PETRO CANADA DURON SHP 15W40 (24 QTS)**

## DIAGNOSIS

**Recommendation**
We advise that you check the fuel injection system. We advise that you check for faulty combustion, plugged air filters, or aftercoolers. Oil and filter change at the time of sampling has been noted. We recommend an early resample to monitor this condition. NOTE: High solids (carbon/soot) in the sample have limited the accuracy of Infra-Red data including Total Base Number (TBN) value.

**Wear**
Cylinder, crank, or cam shaft wear is indicated.

**Contamination**
There is a high amount of fuel present in the oil. There is an abnormal amount of solids and carbon present in the oil.

**Fluid Condition**
Fuel is present in the oil and is lowering the viscosity. The BN level is low. The oil is no longer serviceable due to the presence of contaminants.

| SAMPLE INFORMATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Sample Number | | Client Info | | **GFL0120902** | GFL0103061 | GFL0110358 |
| Sample Date | | Client Info | | **27 Jun 2024** | 29 May 2024 | 06 Feb 2024 |
| Machine Age | hrs | Client Info | | **12858** | 12775 | 12522 |
| Oil Age | hrs | Client Info | | **580** | 198 | 631 |
| Oil Changed | | Client Info | | **Changed** | Not Changd | Changed |
| Sample Status | | | | **SEVERE** | SEVERE | SEVERE |

| CONTAMINATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Water | | WC Method | >0.2 | **NEG** | NEG | NEG |
| Glycol | | WC Method | | **NEG** | NEG | NEG |

| WEAR METALS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Iron | ppm | ASTM D5185m | >100 | ▲ **198** | ▲ 125 | 72 |
| Chromium | ppm | ASTM D5185m | >20 | **4** | 2 | 2 |
| Nickel | ppm | ASTM D5185m | >4 | **3** | 1 | 1 |
| Titanium | ppm | ASTM D5185m | | **<1** | 0 | 0 |
| Silver | ppm | ASTM D5185m | >3 | **<1** | 0 | 0 |
| Aluminum | ppm | ASTM D5185m | >20 | **7** | 5 | 7 |
| Lead | ppm | ASTM D5185m | >40 | **6** | 1 | 1 |
| Copper | ppm | ASTM D5185m | >330 | **5** | 3 | 8 |
| Tin | ppm | ASTM D5185m | >15 | **<1** | 0 | <1 |
| Vanadium | ppm | ASTM D5185m | | **<1** | <1 | 0 |
| Cadmium | ppm | ASTM D5185m | | **<1** | 0 | 0 |

| ADDITIVES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Boron | ppm | ASTM D5185m | 0 | **4** | 0 | 4 |
| Barium | ppm | ASTM D5185m | 0 | **<1** | 0 | 0 |
| Molybdenum | ppm | ASTM D5185m | 60 | **56** | 51 | 53 |
| Manganese | ppm | ASTM D5185m | 0 | **1** | <1 | <1 |
| Magnesium | ppm | ASTM D5185m | 1010 | **641** | 662 | 744 |
| Calcium | ppm | ASTM D5185m | 1070 | **781** | 793 | 838 |
| Phosphorus | ppm | ASTM D5185m | 1150 | **719** | 759 | 817 |
| Zinc | ppm | ASTM D5185m | 1270 | **863** | 868 | 962 |
| Sulfur | ppm | ASTM D5185m | 2060 | **1864** | 2337 | 2400 |

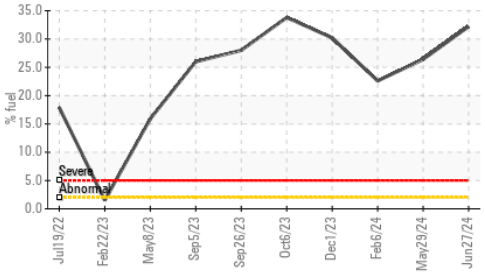
| CONTAMINANTS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Silicon | ppm | ASTM D5185m | >25 | **6** | 0 | 4 |
| Sodium | ppm | ASTM D5185m | | **0** | 1 | 2 |
| Potassium | ppm | ASTM D5185m | >20 | **2** | 0 | 1 |
| Fuel | % | ASTM D3524 | >2.0 | ▲ **32.2** | ▲ 26.4 | ▲ 22.6 |

| INFRA-RED | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Soot % | % | *ASTM D7844 | >3 | ▲ **7.9** | ▲ 4.6 | 2.8 |
| Nitration | Abs/cm | *ASTM D7624 | >20 | **33.7** | 18.3 | 13.7 |
| Sulfation | Abs/.1mm | *ASTM D7415 | >30 | **44.8** | 30.4 | 25.5 |

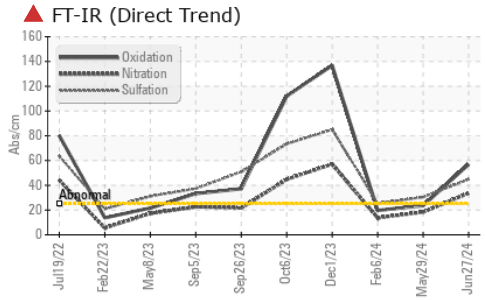
| FLUID DEGRADATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Oxidation | Abs/.1mm | *ASTM D7414 | >25 | **56.9** | 23.6 | 19.7 |
| Base Number (BN) | mg KOH/g | ASTM D2896 | 9.8 | ▲ **0.0** | 6.5 | 8.4 |

# OIL ANALYSIS REPORT

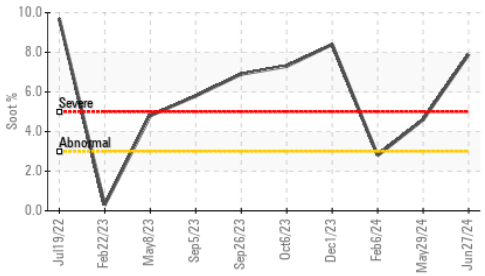
Fuel Dilution



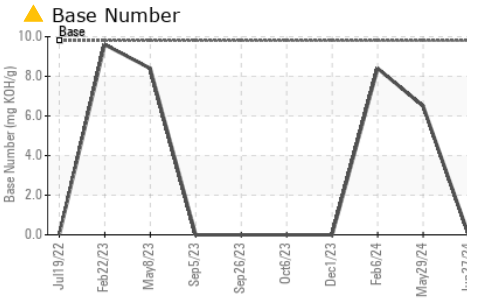

FT-IR (Direct Trend)



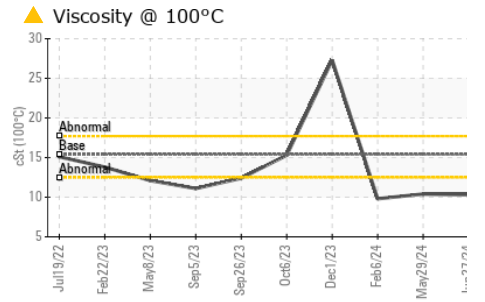

Soot %




Base Number




Viscosity @ 100°C

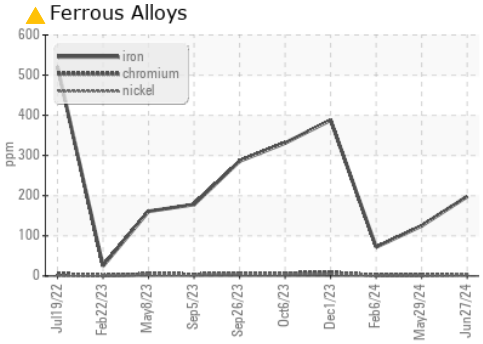



| VISUAL | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| White Metal | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Yellow Metal | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Precipitate | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| 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 |
| Emulsified Water | scalar | *Visual | >0.2 | **NEG** | NEG | NEG |
| Free Water | scalar | *Visual | | **NEG** | NEG | NEG |

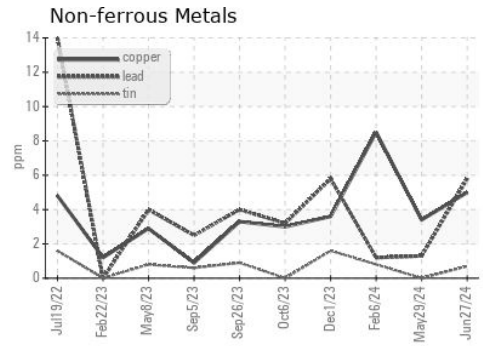
| FLUID PROPERTIES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Visc @ 100°C | cSt | ASTM D445 | 15.4 | ▲ **10.3** | ▲ 10.4 | ▲ 9.8 |

## GRAPHS

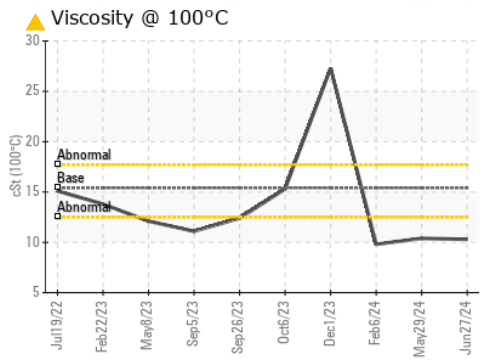
Ferrous Alloys



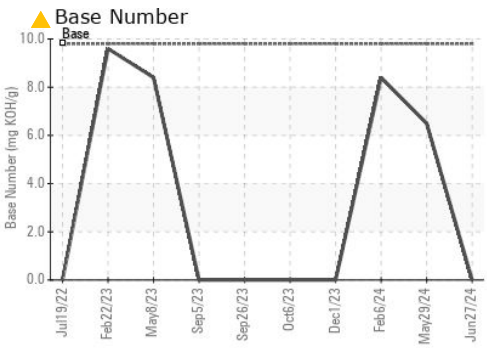

Non-ferrous Metals




Viscosity @ 100°C




Base Number




Certificate L2367

**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513
**Sample No.** : GFL0120902
**Lab Number** : 06226031
**Unique Number** : 11109524
**Test Package** : FLEET ( Additional Tests: PercentFuel )

**Received** : 02 Jul 2024
**Tested** : 03 Jul 2024
**Diagnosed** : 05 Jul 2024 - Jonathan Hester

**GFL Environmental - 622 - Traverse City Hauling**
160 Hughes Dr
Traverse City, MI
US 49686
Contact: GARY BREWER

*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:
F:

Report Id: GFL622 [WUSCAR] 06226031 (Generated: 07/09/2024 19:31:04) Rev: 1

Submitted By: TECHNICIAN ACCOUNT