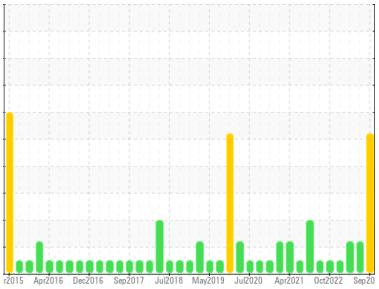
# PROBLEM SUMMARY

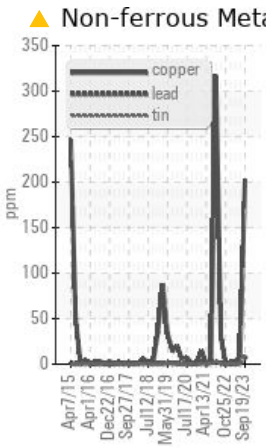
Sample Rating Trend

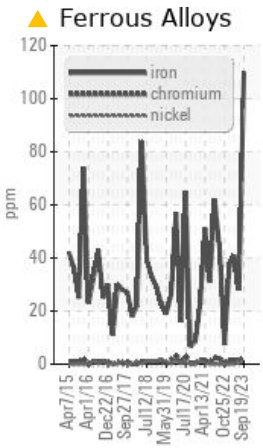


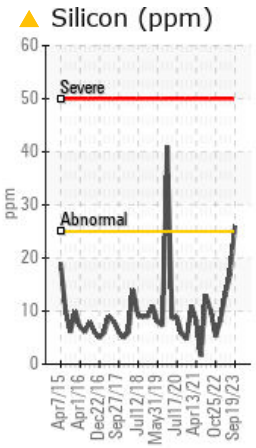
**DIRT**

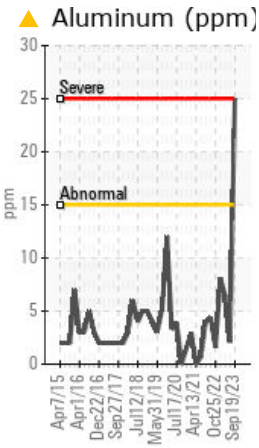
Machine Id
**10564**
Component
**Diesel Engine**
Fluid
**PETRO CANADA DURON SHP 15W40 (11 GAL)**

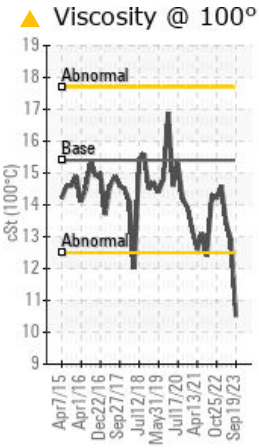
## COMPONENT CONDITION SUMMARY




## RECOMMENDATION

We advise that you check the air filter, air induction system, and any areas where dirt may enter the component. Oil and filter change at the time of sampling has been noted. Resample at the next service interval to monitor.

## PROBLEMATIC TEST RESULTS

| Sample Status | | | | **ABNORMAL** | ABNORMAL | ABNORMAL |
|---|---|---|---|---|---|---|
| Iron | ppm | ASTM D5185m | >75 | ▲ **110** | 28 | 41 |
| Aluminum | ppm | ASTM D5185m | >15 | ▲ **25** | 2 | 6 |
| Copper | ppm | ASTM D5185m | >100 | ▲ **203** | 9 | 2 |
| Tin | ppm | ASTM D5185m | >4 | ▲ **10** | <1 | 0 |
| Silicon | ppm | ASTM D5185m | >25 | ▲ **26** | 17 | 13 |
| Visc @ 100°C | cSt | ASTM D445 | 15.4 | ▲ **10.5** | 12.9 | 13.4 |

**Customer Id:** GFL095
**Sample No.:** GFL0092461
**Lab Number:** 05958056
**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. |
| Check Dirt Access | --- | --- | ? | We advise that you check the air filter, air induction system, and any areas where dirt may enter the component. |

## HISTORICAL DIAGNOSIS

**23 Jun 2023 Diag: Jonathan Hester**

GLYCOL

We advise that you check for possible coolant leak. Check for low coolant level. Oil and filter change at the time of sampling has been noted. We recommend an early resample to monitor this condition.All component wear rates are normal. Sodium and/or potassium levels are high. The BN result indicates that there is suitable alkalinity remaining in the oil.

view report

**18 Apr 2023 Diag: Jonathan Hester**

GLYCOL

We advise that you check for possible coolant leak. Check for low coolant level. Oil and filter change at the time of sampling has been noted. We recommend an early resample to monitor this condition.All component wear rates are normal. Sodium and/or potassium levels are high. The BN result indicates that there is suitable alkalinity remaining in the oil.

view report

**17 Jan 2023 Diag: Wes Davis**

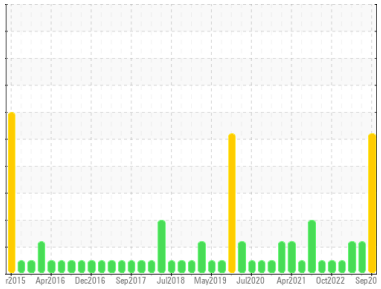
NORMAL

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.

view report

# OIL ANALYSIS REPORT

Sample Rating Trend



**DIRT**

Machine Id
**10564**
Component
**Diesel Engine**
Fluid
**PETRO CANADA DURON SHP 15W40 (11 GAL)**

## DIAGNOSIS

**Recommendation**
We advise that you check the air filter, air induction system, and any areas where dirt may enter the component. Oil and filter change at the time of sampling has been noted. Resample at the next service interval to monitor.

**Wear**
Piston, ring and cylinder wear is indicated. Bearing and/or bushing wear is indicated.

**Contamination**
Fuel content negligible. Elemental levels of silicon (Si) and aluminum (Al) indicate alumina-silicate (coarse dirt) ingress.

**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.

| SAMPLE INFORMATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Sample Number | | Client Info | | **GFL0092461** | GFL0083633 | GFL0074584 |
| Sample Date | | Client Info | | **19 Sep 2023** | 23 Jun 2023 | 18 Apr 2023 |
| Machine Age | hrs | Client Info | | **21513** | 20947 | 20519 |
| Oil Age | hrs | Client Info | | **564** | 428 | 19942 |
| Oil Changed | | Client Info | | **Changed** | Changed | Changed |
| Sample Status | | | | **ABNORMAL** | ABNORMAL | ABNORMAL |

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

| WEAR METALS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Iron | ppm | ASTM D5185m | >75 | ▲ **110** | 28 | 41 |
| Chromium | ppm | ASTM D5185m | >5 | **2** | 2 | 2 |
| Nickel | ppm | ASTM D5185m | >4 | **1** | <1 | 0 |
| Titanium | ppm | ASTM D5185m | >2 | **<1** | <1 | 0 |
| Silver | ppm | ASTM D5185m | >2 | **<1** | 0 | 0 |
| Aluminum | ppm | ASTM D5185m | >15 | ▲ **25** | 2 | 6 |
| Lead | ppm | ASTM D5185m | >25 | **7** | <1 | 0 |
| Copper | ppm | ASTM D5185m | >100 | ▲ **203** | 9 | 2 |
| Tin | ppm | ASTM D5185m | >4 | ▲ **10** | <1 | 0 |
| Vanadium | ppm | ASTM D5185m | | **0** | 0 | 0 |
| Cadmium | ppm | ASTM D5185m | | **0** | <1 | 0 |

| ADDITIVES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Boron | ppm | ASTM D5185m | 0 | **12** | 8 | 11 |
| Barium | ppm | ASTM D5185m | 0 | **0** | <1 | 0 |
| Molybdenum | ppm | ASTM D5185m | 60 | **110** | 85 | 76 |
| Manganese | ppm | ASTM D5185m | 0 | **5** | <1 | <1 |
| Magnesium | ppm | ASTM D5185m | 1010 | **838** | 852 | 972 |
| Calcium | ppm | ASTM D5185m | 1070 | **1527** | 1049 | 1141 |
| Phosphorus | ppm | ASTM D5185m | 1150 | **846** | 889 | 1035 |
| Zinc | ppm | ASTM D5185m | 1270 | **1059** | 1158 | 1276 |
| Sulfur | ppm | ASTM D5185m | 2060 | **2660** | 3290 | 3752 |

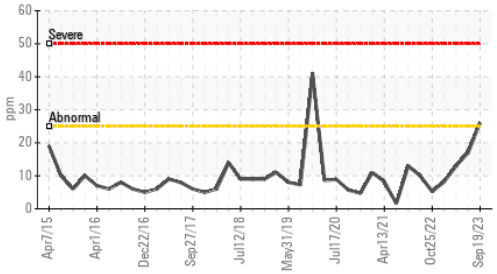
| CONTAMINANTS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Silicon | ppm | ASTM D5185m | >25 | ▲ **26** | 17 | 13 |
| Sodium | ppm | ASTM D5185m | | **6** | ▲ 655 | ▲ 363 |
| Potassium | ppm | ASTM D5185m | >20 | **71** | 4 | <1 |
| Fuel | % | ASTM D3524 | >3.0 | **0.9** | <1.0 | <1.0 |

| INFRA-RED | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Soot % | % | *ASTM D7844 | >6 | **0.1** | 0.8 | 1.4 |
| Nitration | Abs/cm | *ASTM D7624 | >20 | **9.1** | 11.4 | 10.1 |
| Sulfation | Abs/.1mm | *ASTM D7415 | >30 | **22.7** | 22.6 | 20.7 |

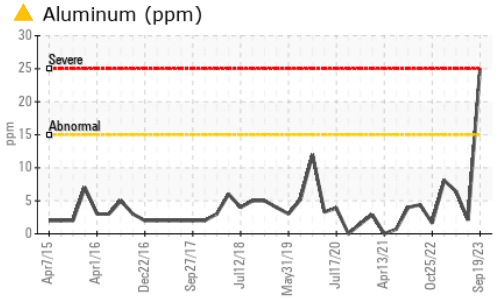
| FLUID DEGRADATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Oxidation | Abs/.1mm | *ASTM D7414 | >25 | **15.5** | 18.2 | 16.2 |
| Base Number (BN) | mg KOH/g | ASTM D2896 | 9.8 | **5.1** | 7.4 | 6.8 |

# OIL ANALYSIS REPORT

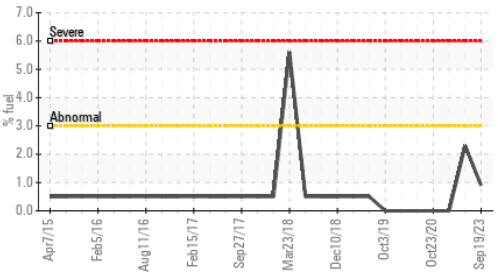
Silicon (ppm)



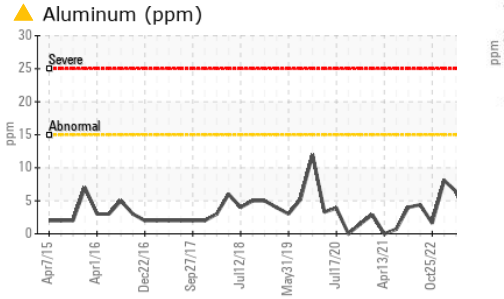

Aluminum (ppm)



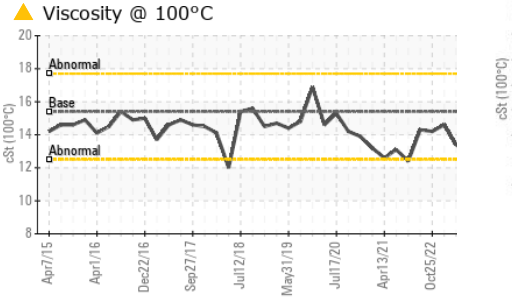

Fuel Dilution




Aluminum (ppm)




Viscosity @ 100°C

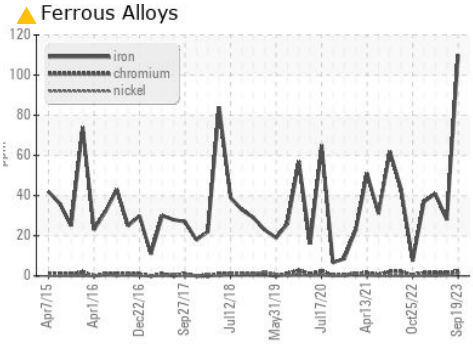



| VISUAL | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| White Metal | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Yellow Metal | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Precipitate | scalar | *Visual | NONE | **NONE** | NONE | NONE |
|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

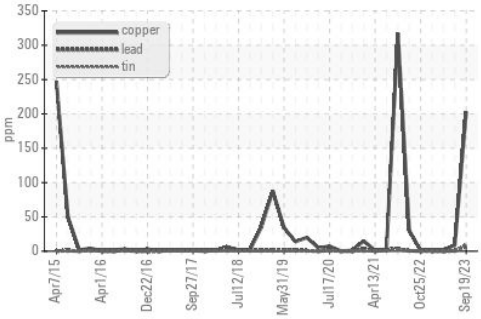
| FLUID PROPERTIES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Visc @ 100°C | cSt | ASTM D445 | 15.4 | ▲ **10.5** | 12.9 | 13.4 |

## GRAPHS

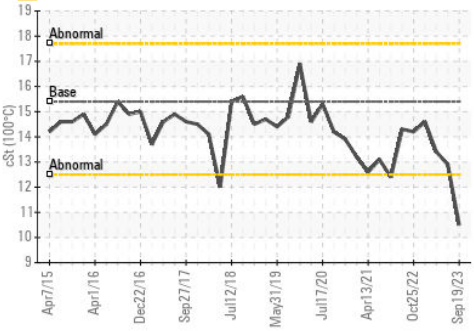
Ferrous Alloys



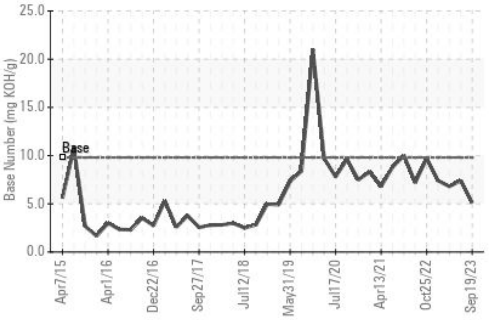

Non-ferrous Metals




Viscosity @ 100°C




Base Number




Certificate L2367

**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513
**Sample No.** : GFL0092461 **Received** : 21 Sep 2023
**Lab Number** : 05958056 **Diagnosed** : 25 Sep 2023
**Unique Number** : 10659269 **Diagnostician** : Jonathan Hester
**Test Package** : FLEET ( Additional Tests: FuelDilution, PercentFuel )

*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)*

**GFL Environmental - 095 - Atlanta West**
2699 Cochran Industrial Blvd
Douglasville, GA
US 30127-1332
Contact: Darrell Welch
darrell.welch@gflenv.com
T: (800)207-6618
F: