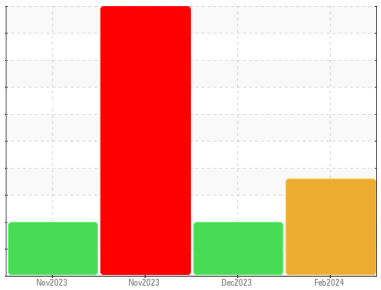
# OIL ANALYSIS REPORT

Sample Rating Trend




**DIRT**

Machine Id
**714064**
Component
**Diesel Engine**
Fluid
**PETRO CANADA DURON SHP 15W40 (--- 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**
Exhaust valve 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 | | **GFL0108931** | GFL0105771 | GFL0101425 |
| Sample Date | | Client Info | | **01 Feb 2024** | 16 Dec 2023 | 28 Nov 2023 |
| Machine Age | hrs | Client Info | | **1512** | 0 | 958 |
| Oil Age | hrs | Client Info | | **0** | 0 | 803 |
| Oil Changed | | Client Info | | **Changed** | Changed | Not Changd |
| Sample Status | | | | **ABNORMAL** | ABNORMAL | SEVERE |

| CONTAMINATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Water | | WC Method | >0.2 | **NEG** | NEG | NEG |
| Glycol | | WC Method | | **NEG** | NEG | 0.12 |

| WEAR METALS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Iron | ppm | ASTM D5185m | >120 | **72** | 45 | 56 |
| Chromium | ppm | ASTM D5185m | >20 | **2** | 2 | 4 |
| Nickel | ppm | ASTM D5185m | >5 | **9** | 6 | <1 |
| Titanium | ppm | ASTM D5185m | >2 | **<1** | <1 | <1 |
| Silver | ppm | ASTM D5185m | >2 | **<1** | <1 | <1 |
| Aluminum | ppm | ASTM D5185m | >20 | **16** | 11 | 6 |
| Lead | ppm | ASTM D5185m | >40 | **<1** | 0 | 0 |
| Copper | ppm | ASTM D5185m | >330 | **233** | 168 | 16 |
| Tin | ppm | ASTM D5185m | >15 | **5** | 3 | <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 | 0 | **49** | 75 | 98 |
| Barium | ppm | ASTM D5185m | 0 | **0** | <1 | 0 |
| Molybdenum | ppm | ASTM D5185m | 60 | **109** | 95 | 191 |
| Manganese | ppm | ASTM D5185m | 0 | **6** | 4 | 2 |
| Magnesium | ppm | ASTM D5185m | 1010 | **727** | 774 | 822 |
| Calcium | ppm | ASTM D5185m | 1070 | **1346** | 1268 | 917 |
| Phosphorus | ppm | ASTM D5185m | 1150 | **715** | 759 | 872 |
| Zinc | ppm | ASTM D5185m | 1270 | **863** | 938 | 1131 |
| Sulfur | ppm | ASTM D5185m | 2060 | **1967** | 2212 | 3280 |

| CONTAMINANTS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Silicon | ppm | ASTM D5185m | >25 | **73** | 57 | 59 |
| Sodium | ppm | ASTM D5185m | | **6** | 4 | 2812 |
| Potassium | ppm | ASTM D5185m | >20 | **44** | 28 | 91 |
| Fuel | % | ASTM D3524 | >3.0 | **0.5** | 0.4 | <1.0 |

| INFRA-RED | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Soot % | % | *ASTM D7844 | >4 | **1** | 0.7 | 1.2 |
| Nitration | Abs/cm | *ASTM D7624 | >20 | **12.5** | 10.3 | 16.1 |
| Sulfation | Abs/.1mm | *ASTM D7415 | >30 | **25.4** | 23.5 | 29.7 |

| FLUID DEGRADATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Oxidation | Abs/.1mm | *ASTM D7414 | >25 | **25.9** | 22.2 | 17.8 |
| Base Number (BN) | mg KOH/g | ASTM D2896 | 9.8 | **4.9** | 6.8 | 16.3 |

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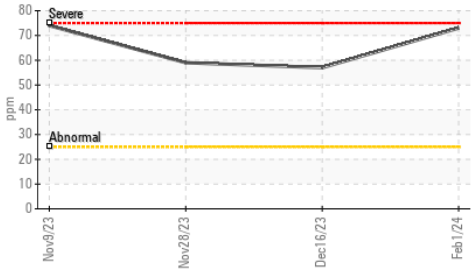
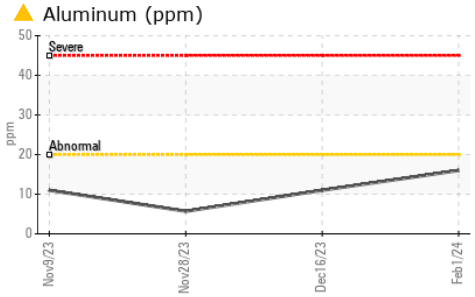
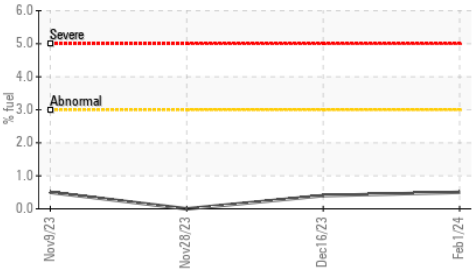
Silicon (ppm)



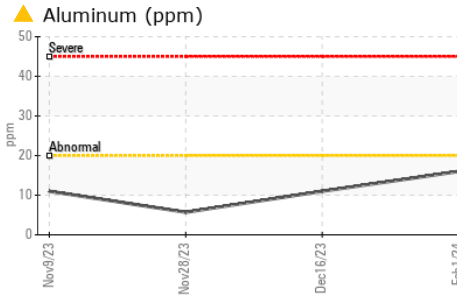

Aluminum (ppm)



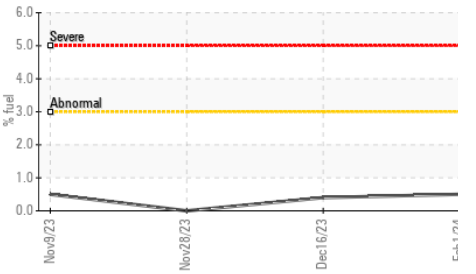

Fuel Dilution




Aluminum (ppm)




Fuel Dilution

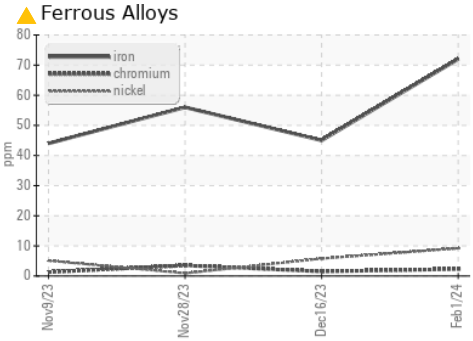



| VISUAL | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| White Metal | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Yellow Metal | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Precipitate | scalar | *Visual | NONE | **NONE** | NONE | NONE |
|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

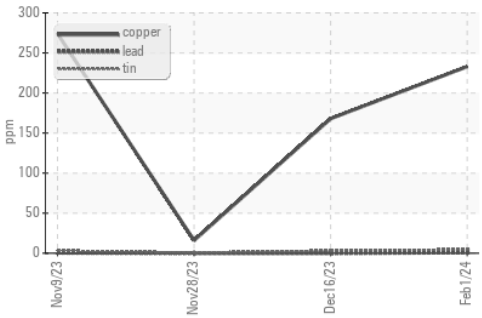
| FLUID PROPERTIES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Visc @ 100°C | cSt | ASTM D445 | 15.4 | ▲ **10.5** | ▲ 11.1 | 15.0 |

## GRAPHS

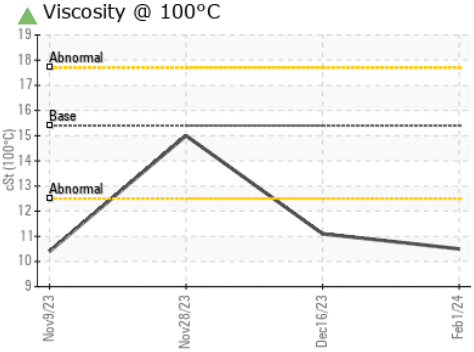
Ferrous Alloys



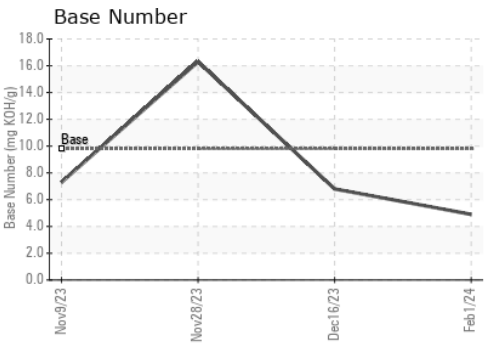

Non-ferrous Metals




Viscosity @ 100°C




Base Number




Certificate L2367

**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513
**Sample No.** : GFL0108931
**Lab Number** : 06081907
**Unique Number** : 10869352
**Test Package** : FLEET ( Additional Tests: FuelDilution, PercentFuel )

**Received** : 06 Feb 2024
**Tested** : 08 Feb 2024
**Diagnosed** : 08 Feb 2024 - Sean Felton

*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)*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