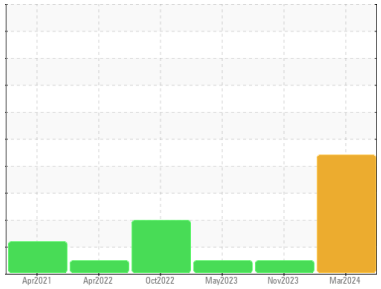
# OIL ANALYSIS REPORT

Sample Rating Trend




**DIRT**

Machine Id
**565M**
Component
**Diesel Engine**
Fluid
**PETRO CANADA DURON SHP 15W40 (5 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. We recommend an early resample to monitor this condition. ( Customer Sample Comment: Early sampling )

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

**Contamination**
Sodium and/or potassium levels are high. Elemental levels of silicon (Si) and aluminum (Al) indicate alumina-silicate (coarse dirt) ingress. Test for glycol is negative.

**Fluid Condition**
The BN result indicates that there is suitable alkalinity remaining in the oil.

| SAMPLE INFORMATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Sample Number | | Client Info | | **GFL0115177** | GFL0089173 | GFL0069905 |
| Sample Date | | Client Info | | **26 Mar 2024** | 21 Nov 2023 | 21 May 2023 |
| Machine Age | hrs | Client Info | | **17233** | 16402 | 15324 |
| Oil Age | hrs | Client Info | | **0** | 2600 | 600 |
| Oil Changed | | Client Info | | **Changed** | Changed | Changed |
| Sample Status | | | | **ABNORMAL** | NORMAL | NORMAL |

| CONTAMINATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Fuel | | WC Method | >3.0 | **<1.0** | <1.0 | <1.0 |
| Water | | WC Method | >0.2 | **NEG** | NEG | NEG |

| WEAR METALS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Iron | ppm | ASTM D5185m | >90 | ▲ **178** | 43 | 15 |
| Chromium | ppm | ASTM D5185m | >20 | **6** | 2 | <1 |
| Nickel | ppm | ASTM D5185m | >2 | **4** | <1 | <1 |
| Titanium | ppm | ASTM D5185m | >2 | **<1** | <1 | 0 |
| Silver | ppm | ASTM D5185m | >2 | **0** | 0 | 0 |
| Aluminum | ppm | ASTM D5185m | >20 | ● **12** | 3 | 3 |
| Lead | ppm | ASTM D5185m | >40 | **<1** | 0 | <1 |
| Copper | ppm | ASTM D5185m | >330 | **3** | 1 | <1 |
| Tin | ppm | ASTM D5185m | >15 | **0** | 0 | <1 |
| Vanadium | ppm | ASTM D5185m | | **0** | <1 | 0 |
| Cadmium | ppm | ASTM D5185m | | **0** | 0 | 0 |

| ADDITIVES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Boron | ppm | ASTM D5185m | 0 | **2** | <1 | 4 |
| Barium | ppm | ASTM D5185m | 0 | **0** | 0 | 0 |
| Molybdenum | ppm | ASTM D5185m | 60 | **64** | 58 | 57 |
| Manganese | ppm | ASTM D5185m | 0 | **1** | <1 | <1 |
| Magnesium | ppm | ASTM D5185m | 1010 | **1047** | 940 | 935 |
| Calcium | ppm | ASTM D5185m | 1070 | **1193** | 1023 | 1031 |
| Phosphorus | ppm | ASTM D5185m | 1150 | **1046** | 940 | 1002 |
| Zinc | ppm | ASTM D5185m | 1270 | **1315** | 1283 | 1229 |
| Sulfur | ppm | ASTM D5185m | 2060 | **3526** | 2920 | 3402 |

| CONTAMINANTS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Silicon | ppm | ASTM D5185m | >25 | ▲ **31** | 13 | 6 |
| Sodium | ppm | ASTM D5185m | | ● **137** | 74 | 7 |
| Potassium | ppm | ASTM D5185m | >20 | **3** | 2 | 5 |
| Glycol | % | *ASTM D2982 | | **NEG** | NEG | NEG |

| INFRA-RED | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Soot % | % | *ASTM D7844 | >6 | **1.1** | 0.7 | 0.3 |
| Nitration | Abs/cm | *ASTM D7624 | >20 | **12.4** | 10.6 | 10.1 |
| Sulfation | Abs/.1mm | *ASTM D7415 | >30 | **23.2** | 21.3 | 19.8 |

| FLUID DEGRADATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Oxidation | Abs/.1mm | *ASTM D7414 | >25 | **20.3** | 18.2 | 16.3 |
| Base Number (BN) | mg KOH/g | ASTM D2896 | 9.8 | **7.8** | 7.3 | 8.0 |

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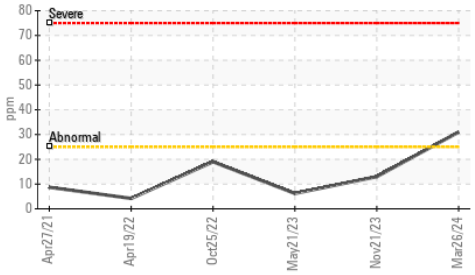
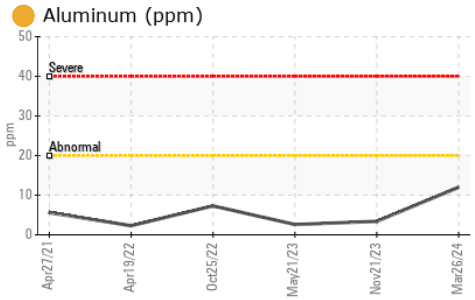
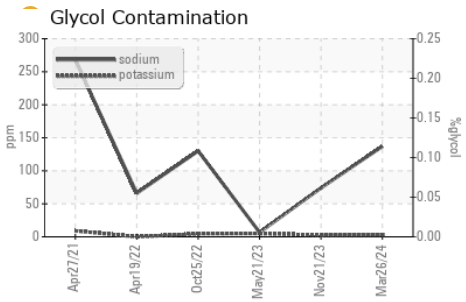
Silicon (ppm)



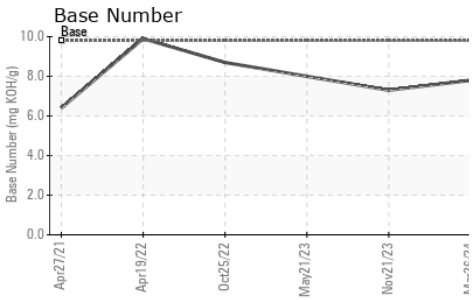

Aluminum (ppm)



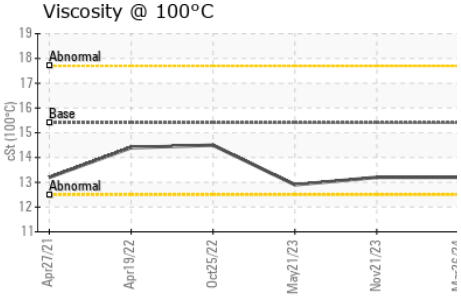

Glycol Contamination




Base Number




Viscosity @ 100°C

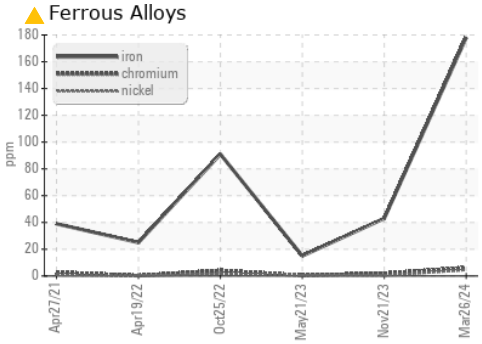



| VISUAL | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| White Metal | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Yellow Metal | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Precipitate | scalar | *Visual | NONE | **NONE** | NONE | NONE |
|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

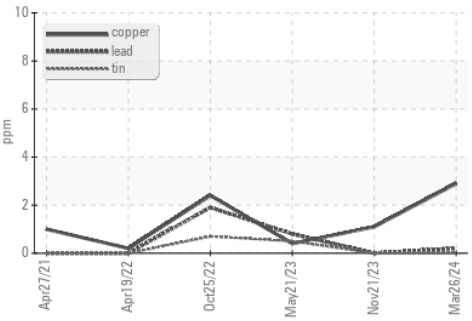
| FLUID PROPERTIES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Visc @ 100°C | cSt | ASTM D445 | 15.4 | **13.2** | 13.2 | 12.9 |

## GRAPHS

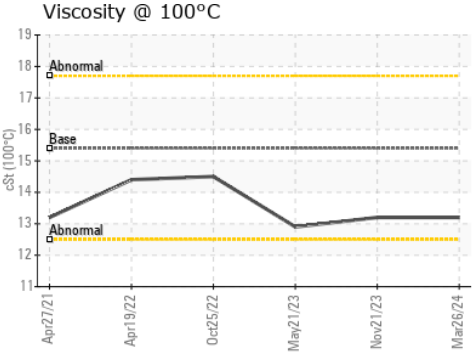
Ferrous Alloys



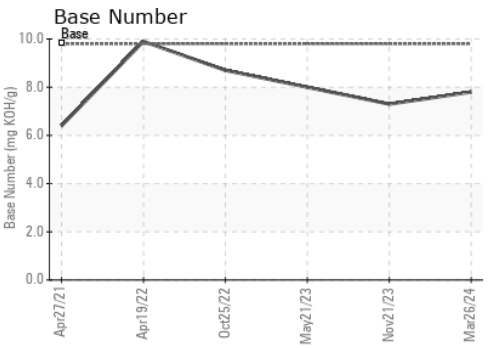

Non-ferrous Metals




Viscosity @ 100°C




Base Number




Certificate L2367

**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513
**Sample No.** : GFL0115177
**Lab Number** : 06132946
**Unique Number** : 10952411
**Test Package** : FLEET ( Additional Tests: Glycol )

**Received** : 29 Mar 2024
**Tested** : 03 Apr 2024
**Diagnosed** : 03 Apr 2024 - Jonathan Hester

*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 - 405 - Arbor Hills**
7811 Chubb Rd
NORTHVILLE, MI
US 48168
Contact: Anthony Hopkins
ahopkins@gflenv.com
T:
F: