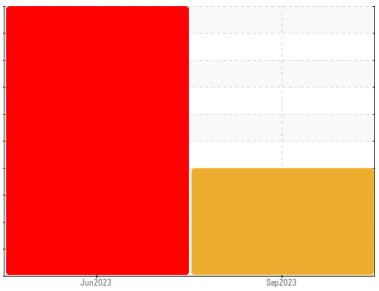
OIL DIAGNOSTICS

# OIL ANALYSIS REPORT

Sample Rating Trend




**DIRT**

Machine Id
## FREIGHTLINER 108
Component
**Diesel Engine**
Fluid
**PETRO CANADA DURON SHP 15W40 (13 LTR)**

## DIAGNOSIS

**Recommendation**
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**
All component wear rates are normal.

**Contamination**
There is an abnormal amount of solids and carbon present in the oil. Elemental level of silicon.

**Fluid Condition**
The oil viscosity is higher than normal. The BN level is low.

| SAMPLE INFORMATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Sample Number | | Client Info | | **PCA0102619** | PCA0100628 | --- |
| Sample Date | | Client Info | | **28 Sep 2023** | 27 Jun 2023 | --- |
| Machine Age | mls | Client Info | | **389446** | 363062 | --- |
| Oil Age | mls | Client Info | | **27543** | 32563 | --- |
| Oil Changed | | Client Info | | **Changed** | Changed | --- |
| Sample Status | | | | **ABNORMAL** | SEVERE | --- |

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

| WEAR METALS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Iron | ppm | ASTM D5185m | >80 | **72** | ▲ 125 | --- |
| Chromium | ppm | ASTM D5185m | >5 | **4** | ▲ 8 | --- |
| Nickel | ppm | ASTM D5185m | >2 | **<1** | <1 | --- |
| Titanium | ppm | ASTM D5185m | | **<1** | 0 | --- |
| Silver | ppm | ASTM D5185m | >3 | **<1** | 0 | --- |
| Aluminum | ppm | ASTM D5185m | >30 | **1** | 3 | --- |
| Lead | ppm | ASTM D5185m | >30 | **5** | 6 | --- |
| Copper | ppm | ASTM D5185m | >150 | **3** | 7 | --- |
| Tin | ppm | ASTM D5185m | >5 | **3** | 8 | --- |
| Vanadium | ppm | ASTM D5185m | | **0** | 0 | --- |
| Cadmium | ppm | ASTM D5185m | | **0** | 0 | --- |

| ADDITIVES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Boron | ppm | ASTM D5185m | 0 | **1** | <1 | --- |
| Barium | ppm | ASTM D5185m | 0 | **0** | 0 | --- |
| Molybdenum | ppm | ASTM D5185m | 60 | **59** | 58 | --- |
| Manganese | ppm | ASTM D5185m | 0 | **<1** | 3 | --- |
| Magnesium | ppm | ASTM D5185m | 1010 | **924** | 851 | --- |
| Calcium | ppm | ASTM D5185m | 1070 | **1124** | 1182 | --- |
| Phosphorus | ppm | ASTM D5185m | 1150 | **955** | 955 | --- |
| Zinc | ppm | ASTM D5185m | 1270 | **1207** | 1187 | --- |
| Sulfur | ppm | ASTM D5185m | 2060 | **3107** | 2790 | --- |

| CONTAMINANTS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Silicon | ppm | ASTM D5185m | >20 | ▲ **25** | ▲ 81 | --- |
| Sodium | ppm | ASTM D5185m | | **1** | 13 | --- |
| Potassium | ppm | ASTM D5185m | >20 | **4** | 8 | --- |
| Fuel | % | ASTM D3524 | >5 | **<1.0** | <1.0 | --- |

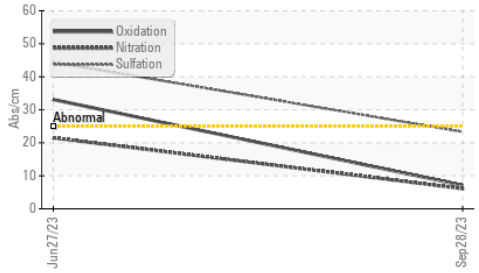
| INFRA-RED | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Soot % | % | *ASTM D7844 | >3 | ▲ **3.9** | ▲ 6.9 | --- |
| Nitration | Abs/cm | *ASTM D7624 | >20 | **6.1** | 21.5 | --- |
| Sulfation | Abs/.1mm | *ASTM D7415 | >30 | **23.3** | 44.4 | --- |

| FLUID DEGRADATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Oxidation | Abs/.1mm | *ASTM D7414 | >25 | **7.1** | 33.1 | --- |
| Base Number (BN) | mg KOH/g | ASTM D2896 | 9.8 | ▲ **0.0** | ▲ 0.0 | --- |

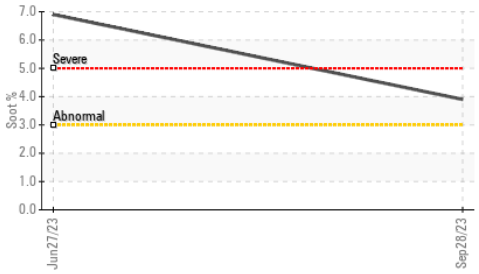
OIL DIAGNOSTICS

# OIL ANALYSIS REPORT

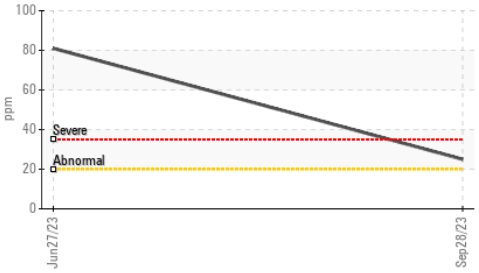
FT-IR (Direct Trend)



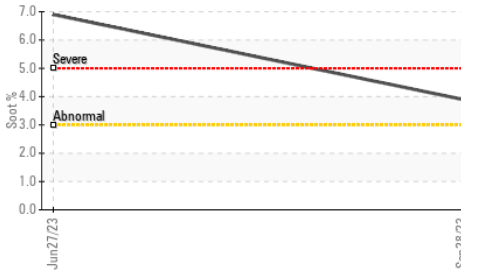

Soot %



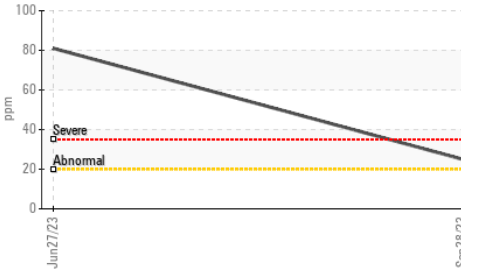

Silicon (ppm)




Soot %




Silicon (ppm)

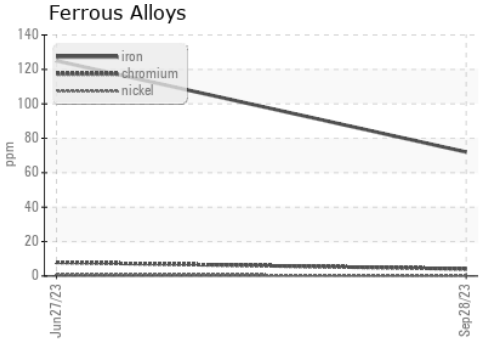



| VISUAL | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| White Metal | scalar | *Visual | NONE | **NONE** | NONE | --- |
| Yellow Metal | scalar | *Visual | NONE | **NONE** | NONE | --- |
| Precipitate | scalar | *Visual | NONE | **NONE** | NONE | --- |
| Silt | scalar | *Visual | NONE | **NONE** | NONE | --- |
| Debris | scalar | *Visual | NONE | **NONE** | NONE | --- |
| Sand/Dirt | scalar | *Visual | NONE | **NONE** | NONE | --- |
| Appearance | scalar | *Visual | NORML | **NORML** | NORML | --- |
| Odor | scalar | *Visual | NORML | **NORML** | NORML | --- |
| Emulsified Water | scalar | *Visual | >0.2 | **NEG** | NEG | --- |
| Free Water | scalar | *Visual | | **NEG** | NEG | --- |

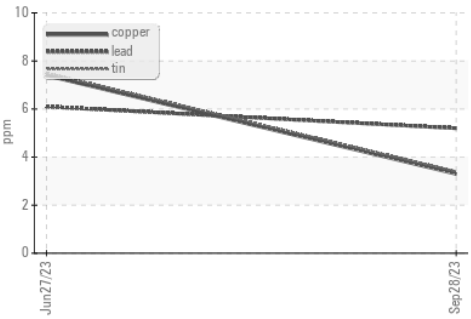
| FLUID PROPERTIES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Visc @ 100°C | cSt | ASTM D445 | 15.4 | ▲ **22.2** | ▲ 17.5 | --- |

## GRAPHS

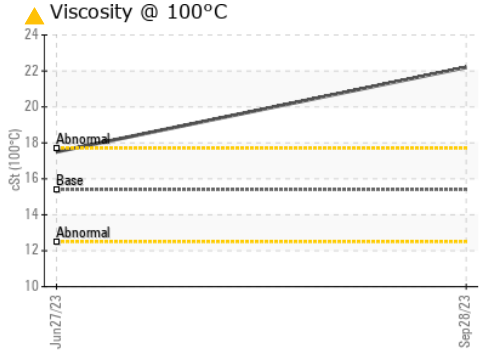
Ferrous Alloys



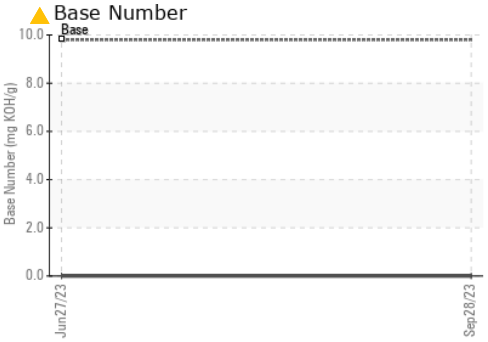

Non-ferrous Metals




Viscosity @ 100°C




Base Number




Certificate L2367

**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513
**Sample No.** : PCA0102619 **Received** : 23 May 2024
**Lab Number** : 06188592 **Tested** : 24 May 2024
**Unique Number** : 11045344 **Diagnosed** : 28 May 2024 - Don Baldridge
**Test Package** : FLEET ( Additional Tests: FuelDilution )

*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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Pineville, NC
US 28134
Contact: Vlad Melnichuk
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T: (980)255-3200
F:

Report Id: ATRPIN [WUSCAR] 06188592 (Generated: 05/28/2024 15:01:36) Rev: 1

Submitted By: Vlad Melnichuk