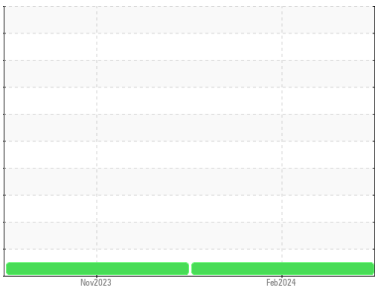
OIL DIAGNOSTICS

# OIL ANALYSIS REPORT

Sample Rating Trend




NORMAL

Machine Id
**201**
Component
**Diesel Engine**
Fluid
**RED GIANT LOCOMOTIVE EO 20W40 (--- GAL)**

## DIAGNOSIS

**Recommendation**
Resample at the next service interval to monitor.

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

**Contamination**
There is no indication of any contamination in the oil.

**Fluid Condition**
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

| SAMPLE INFORMATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Sample Number | | Client Info | | **PCA0092728** | PCA0092731 | --- |
| Sample Date | | Client Info | | **14 Feb 2024** | 07 Nov 2023 | --- |
| Machine Age | hrs | Client Info | | **0** | 0 | --- |
| Oil Age | hrs | Client Info | | **0** | 0 | --- |
| Oil Changed | | Client Info | | **N/A** | N/A | --- |
| Sample Status | | | | **NORMAL** | NORMAL | --- |

| CONTAMINATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Fuel | | WC Method | >4 | **<1.0** | <1.0 | --- |
| Water | | WC Method | >0.20 | **NEG** | NEG | --- |
| Glycol | | WC Method | | **NEG** | NEG | --- |

| WEAR METALS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Iron | ppm | ASTM D5185m | >100 | **10** | 12 | --- |
| Chromium | ppm | ASTM D5185m | >15 | **<1** | 0 | --- |
| Nickel | ppm | ASTM D5185m | >5 | **0** | 0 | --- |
| Titanium | ppm | ASTM D5185m | | **0** | 0 | --- |
| Silver | ppm | ASTM D5185m | >2 | **<1** | 0 | --- |
| Aluminum | ppm | ASTM D5185m | >10 | **2** | <1 | --- |
| Lead | ppm | ASTM D5185m | >75 | **12** | 9 | --- |
| Copper | ppm | ASTM D5185m | >90 | **7** | 8 | --- |
| Tin | ppm | ASTM D5185m | >30 | **1** | <1 | --- |
| Vanadium | ppm | ASTM D5185m | | **0** | 0 | --- |
| Cadmium | ppm | ASTM D5185m | | **<1** | 0 | --- |

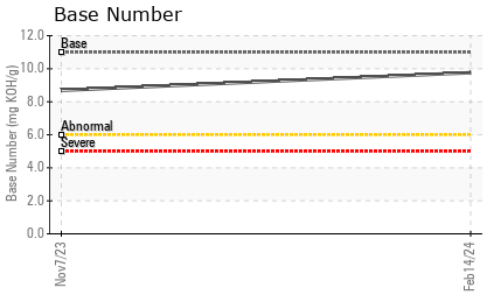
| ADDITIVES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Boron | ppm | ASTM D5185m | | **36** | 31 | --- |
| Barium | ppm | ASTM D5185m | | **0** | 0 | --- |
| Molybdenum | ppm | ASTM D5185m | | **41** | 39 | --- |
| Manganese | ppm | ASTM D5185m | | **<1** | 0 | --- |
| Magnesium | ppm | ASTM D5185m | | **13** | 10 | --- |
| Calcium | ppm | ASTM D5185m | | **3088** | 2949 | --- |
| Phosphorus | ppm | ASTM D5185m | 0 | **1** | 0 | --- |
| Zinc | ppm | ASTM D5185m | 0 | **0** | <1 | --- |
| Sulfur | ppm | ASTM D5185m | 1900 | **2782** | 2661 | --- |

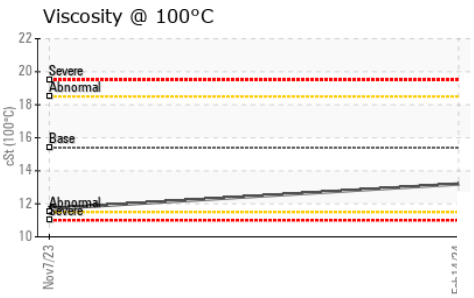
| CONTAMINANTS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Silicon | ppm | ASTM D5185m | >17 | **4** | 3 | --- |
| Sodium | ppm | ASTM D5185m | | **20** | 8 | --- |
| Potassium | ppm | ASTM D5185m | >20 | **2** | <1 | --- |

| INFRA-RED | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Soot % | % | *ASTM D7844 | >3 | **0.6** | 1.5 | --- |
| Nitration | Abs/cm | *ASTM D7624 | >20 | **7.2** | 9.1 | --- |
| Sulfation | Abs/.1mm | *ASTM D7415 | >30 | **13.8** | 16.9 | --- |

| FLUID DEGRADATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Oxidation | Abs/.1mm | *ASTM D7414 | >25 | **6.2** | 7.1 | --- |
| Base Number (BN) | mg KOH/g | ASTM D2896 | 11 | **9.76** | 8.69 | --- |

# OIL ANALYSIS REPORT

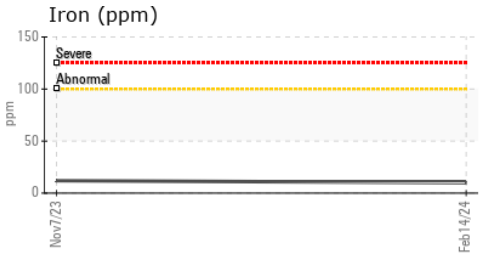


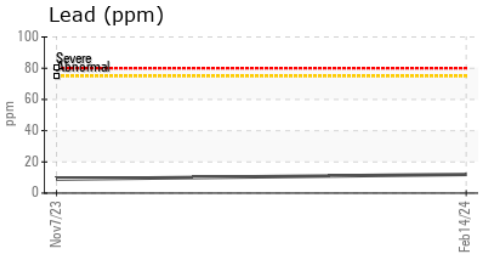



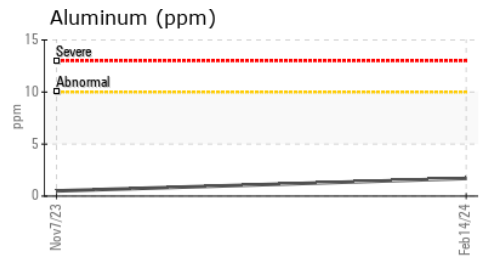

| VISUAL | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| White Metal | scalar | *Visual | NONE | **NONE** | NONE | --- |
| Yellow Metal | scalar | *Visual | NONE | **NONE** | NONE | --- |
| Precipitate | scalar | *Visual | NONE | **NONE** | NONE | --- |
| Silt | 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 | >0.20 | **NEG** | NEG | --- |
| Free Water | scalar | *Visual | | **NEG** | NEG | --- |

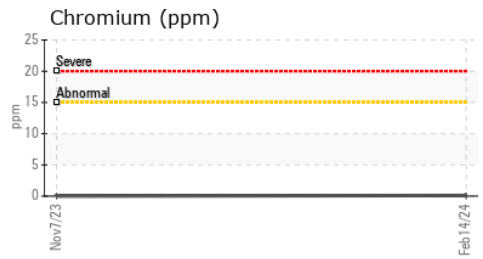
| FLUID PROPERTIES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Visc @ 100°C | cSt | ASTM D445 | 15.4 | **13.2** | 11.7 | --- |

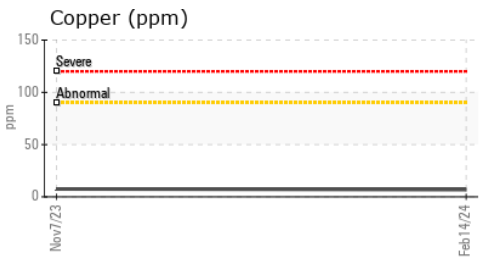
## GRAPHS

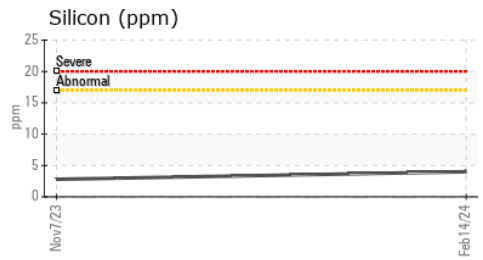


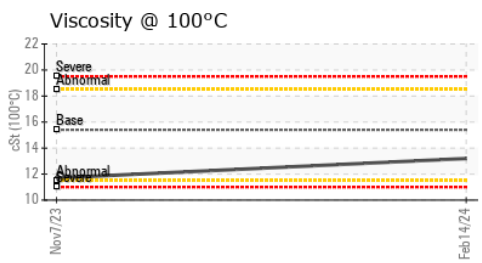



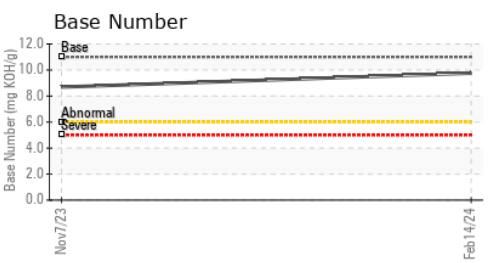




Certificate L2367

**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513
**Sample No.** : PCA0092728
**Lab Number** : 06101911
**Unique Number** : 10900141
**Test Package** : MOB 2

**Received** : 27 Feb 2024
**Tested** : 28 Feb 2024
**Diagnosed** : 28 Feb 2024 - Wes Davis

*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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