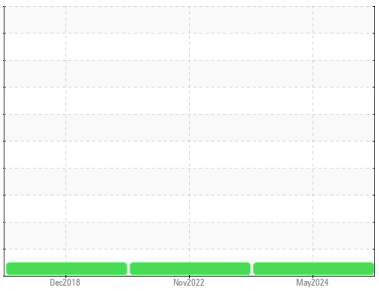
OIL DIAGNOSTICS

# OIL ANALYSIS REPORT

Sample Rating Trend




NORMAL

Machine Id
## CATERPILLAR 190-151
Component
**Diesel Engine**
Fluid
**PETRO CANADA DURON SHP 15W40 (--- 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 | | **PCA0106877** | PCA0070815 | LWI-304090 |
| Sample Date | | Client Info | | **28 May 2024** | 29 Nov 2022 | 18 Dec 2018 |
| Machine Age | hrs | Client Info | | **14053** | 14045 | 13741 |
| Oil Age | hrs | Client Info | | **500** | 350 | 350 |
| Oil Changed | | Client Info | | **Changed** | Changed | Changed |
| Sample Status | | | | **NORMAL** | NORMAL | NORMAL |

| CONTAMINATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Fuel | | WC Method | >5 | **<1.0** | <1.0 | <1.0 |
| Water | | WC Method | >0.2 | **NEG** | NEG | NEG |
| Glycol | | WC Method | | **NEG** | NEG | NEG |

| WEAR METALS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Iron | ppm | ASTM D5185m | >86 | **4** | 19 | 46 |
| Chromium | ppm | ASTM D5185m | >3 | **0** | <1 | 0 |
| Nickel | ppm | ASTM D5185m | >3 | **0** | <1 | 0 |
| Titanium | ppm | ASTM D5185m | >2 | **0** | <1 | 0 |
| Silver | ppm | ASTM D5185m | >2 | **0** | 0 | 0 |
| Aluminum | ppm | ASTM D5185m | >15 | **1** | 1 | 2 |
| Lead | ppm | ASTM D5185m | >16 | **<1** | 2 | 2 |
| Copper | ppm | ASTM D5185m | >250 | **2** | 13 | 46 |
| Tin | ppm | ASTM D5185m | >2 | **<1** | 2 | 0 |
| Antimony | ppm | ASTM D5185m | | **---** | --- | 0 |
| Vanadium | ppm | ASTM D5185m | | **0** | 0 | 0 |
| Cadmium | ppm | ASTM D5185m | | **0** | 0 | 0 |

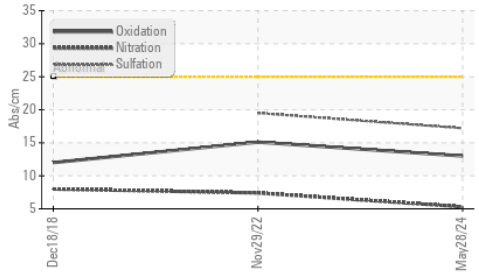
| ADDITIVES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Boron | ppm | ASTM D5185m | 0 | **6** | 11 | 56 |
| Barium | ppm | ASTM D5185m | 0 | **<1** | 0 | 0 |
| Molybdenum | ppm | ASTM D5185m | 60 | **53** | 58 | 3 |
| Manganese | ppm | ASTM D5185m | 0 | **<1** | <1 | 0 |
| Magnesium | ppm | ASTM D5185m | 1010 | **874** | 853 | 43 |
| Calcium | ppm | ASTM D5185m | 1070 | **1004** | 1279 | 2402 |
| Phosphorus | ppm | ASTM D5185m | 1150 | **1018** | 1019 | 1050 |
| Zinc | ppm | ASTM D5185m | 1270 | **1177** | 1294 | 1190 |
| Sulfur | ppm | ASTM D5185m | 2060 | **3478** | 3645 | --- |
| Lithium | ppm | ASTM D5185m | | **---** | --- | 0 |

| CONTAMINANTS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Silicon | ppm | ASTM D5185m | >35 | **3** | 2 | 5 |
| Sodium | ppm | ASTM D5185m | | **2** | 3 | 10 |
| Potassium | ppm | ASTM D5185m | >20 | **2** | <1 | 2 |

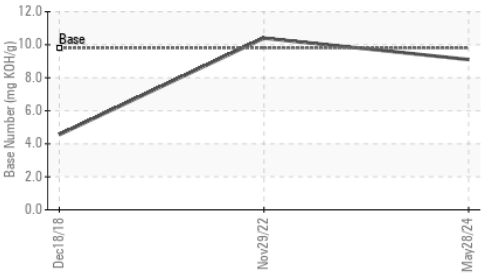
| INFRA-RED | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Soot % | % | *ASTM D7844 | >3 | **0.2** | 0.4 | --- |
| Nitration | Abs/cm | *ASTM D7624 | >20 | **5.3** | 7.4 | 8 |
| Sulfation | Abs/.1mm | *ASTM D7415 | >30 | **17.2** | 19.5 | --- |

# OIL ANALYSIS REPORT

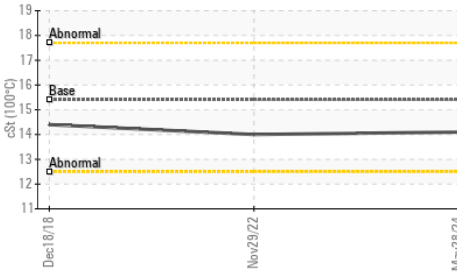
FT-IR (Direct Trend)




Base Number




Viscosity @ 100°C



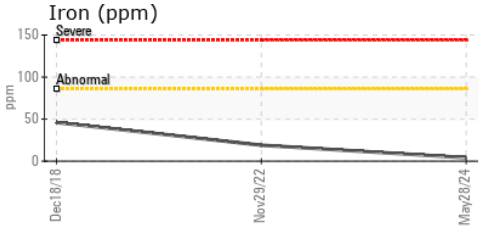

| FLUID DEGRADATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Oxidation | Abs/.1mm | *ASTM D7414 | >25 | **13.0** | 15.1 | 12 |
| Base Number (BN) | mg KOH/g | ASTM D2896 | 9.8 | **9.1** | 10.4 | 4.55 |

| 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 | --- |

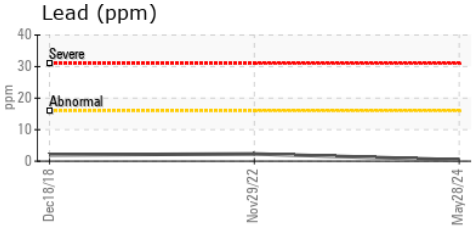
| FLUID PROPERTIES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Visc @ 100°C | cSt | ASTM D445 | 15.4 | **14.1** | 14.0 | 14.4 |

## GRAPHS

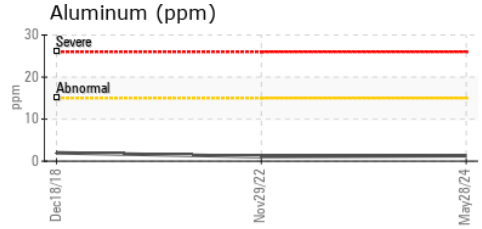
Iron (ppm)



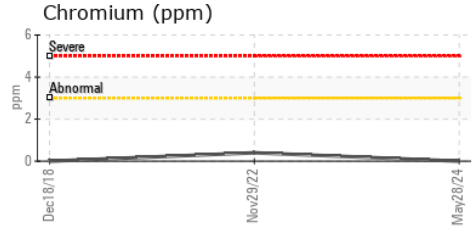

Lead (ppm)



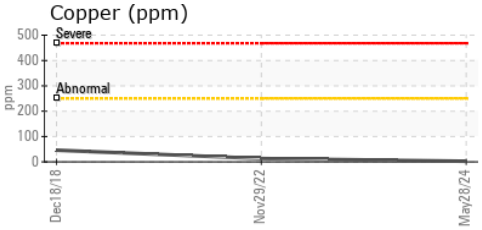

Aluminum (ppm)



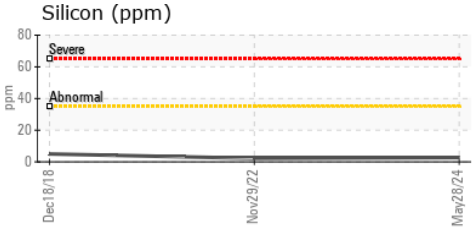

Chromium (ppm)



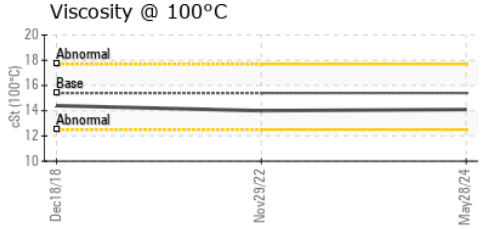

Copper (ppm)



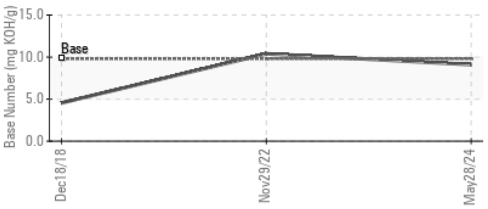

Silicon (ppm)




Viscosity @ 100°C




Base Number




Certificate L2367

**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513
**Sample No.** : PCA0106877 **Received** : 06 Jun 2024
**Lab Number** : 06201173 **Tested** : 07 Jun 2024
**Unique Number** : 11063296 **Diagnosed** : 07 Jun 2024 - Wes Davis
**Test Package** : MOB 1 ( Additional Tests: TBN )

*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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