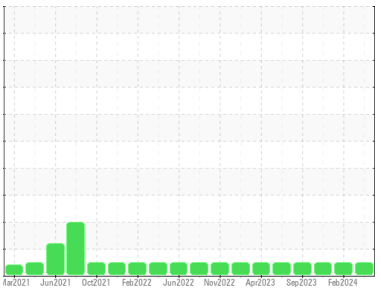
# OIL ANALYSIS REPORT

Sample Rating Trend




NORMAL

Machine Id
## KENWORTH 331
Component
**Diesel Engine**
Fluid
**SERVICE PRO 15W40 SYN BLEND (--- 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 | | **RW0005400** | RW0004772 | RW0004766 |
| Sample Date | | Client Info | | **06 May 2024** | 27 Feb 2024 | 11 Dec 2023 |
| Machine Age | mls | Client Info | | **282592** | 266971 | 250377 |
| Oil Age | mls | Client Info | | **15621** | 16594 | 17450 |
| Oil Changed | | Client Info | | **Changed** | Changed | Changed |
| Sample Status | | | | **NORMAL** | 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 |
| Glycol | | WC Method | | **NEG** | NEG | NEG |

| WEAR METALS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Iron | ppm | ASTM D5185m | >165 | **28** | 32 | 30 |
| Chromium | ppm | ASTM D5185m | >5 | **<1** | 1 | 1 |
| Nickel | ppm | ASTM D5185m | >4 | **0** | 0 | 0 |
| Titanium | ppm | ASTM D5185m | >2 | **0** | <1 | 0 |
| Silver | ppm | ASTM D5185m | >2 | **0** | <1 | 0 |
| Aluminum | ppm | ASTM D5185m | >20 | **6** | 6 | 5 |
| Lead | ppm | ASTM D5185m | >150 | **2** | 2 | 2 |
| Copper | ppm | ASTM D5185m | >90 | **0** | 1 | <1 |
| Tin | ppm | ASTM D5185m | >5 | **1** | <1 | 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 | | **8** | 2 | 2 |
| Barium | ppm | ASTM D5185m | | **1** | 1 | 0 |
| Molybdenum | ppm | ASTM D5185m | | **66** | 66 | 64 |
| Manganese | ppm | ASTM D5185m | | **<1** | <1 | <1 |
| Magnesium | ppm | ASTM D5185m | | **915** | 962 | 986 |
| Calcium | ppm | ASTM D5185m | | **1193** | 1179 | 1237 |
| Phosphorus | ppm | ASTM D5185m | | **1104** | 1142 | 1041 |
| Zinc | ppm | ASTM D5185m | | **1286** | 1285 | 1272 |
| Sulfur | ppm | ASTM D5185m | | **3378** | 3180 | 3008 |

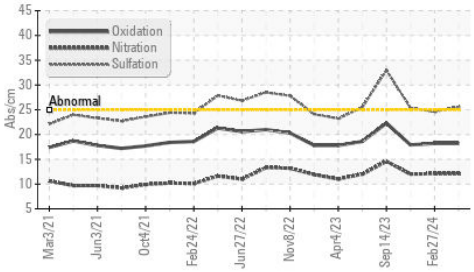
| CONTAMINANTS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Silicon | ppm | ASTM D5185m | >35 | **5** | 5 | 5 |
| Sodium | ppm | ASTM D5185m | | **3** | 2 | 2 |
| Potassium | ppm | ASTM D5185m | >20 | **6** | 7 | 3 |

| INFRA-RED | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Soot % | % | *ASTM D7844 | >7.5 | **2.1** | 2 | 2.2 |
| Nitration | Abs/cm | *ASTM D7624 | >20 | **12.1** | 12.1 | 12.0 |
| Sulfation | Abs/.1mm | *ASTM D7415 | >30 | **25.6** | 24.6 | 25.4 |

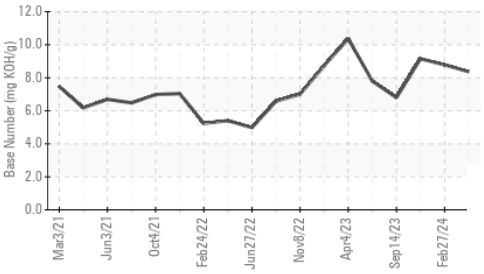
| FLUID DEGRADATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Oxidation | Abs/.1mm | *ASTM D7414 | >25 | **18.2** | 18.2 | 17.9 |
| Base Number (BN) | mg KOH/g | ASTM D2896 | | **8.37** | 8.78 | 9.15 |

# OIL ANALYSIS REPORT

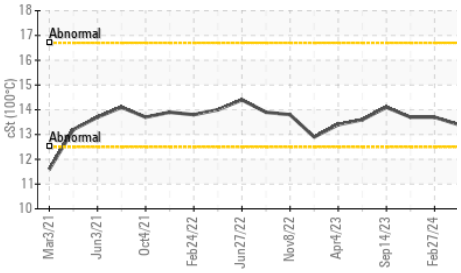
FT-IR (Direct Trend)




Base Number




Viscosity @ 100°C

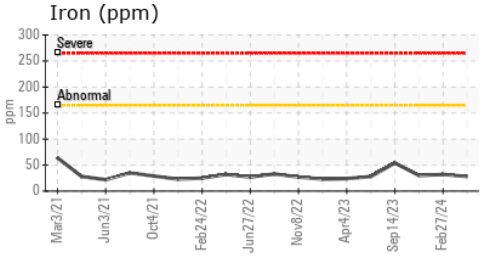



| VISUAL | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| White Metal | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Yellow Metal | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Precipitate | scalar | *Visual | NONE | **NONE** | NONE | NONE |
|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

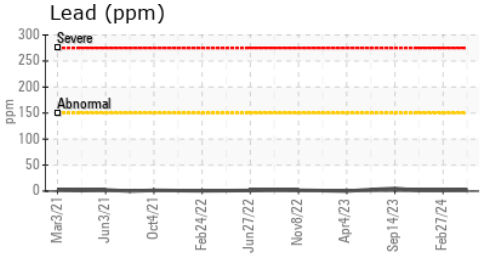
| FLUID PROPERTIES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Visc @ 100°C | cSt | ASTM D445 | | **13.4** | 13.7 | 13.7 |

## GRAPHS

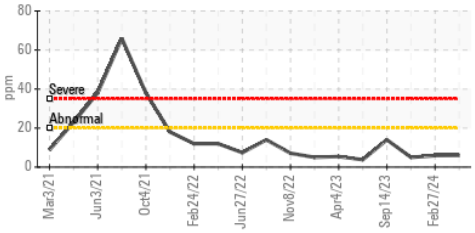
Iron (ppm)



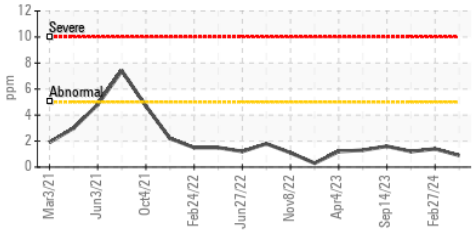

Lead (ppm)



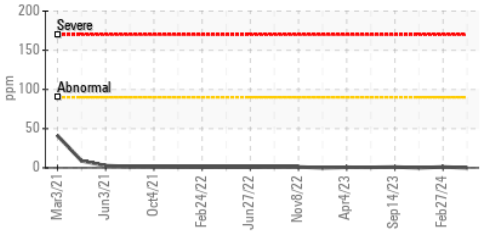

Aluminum (ppm)



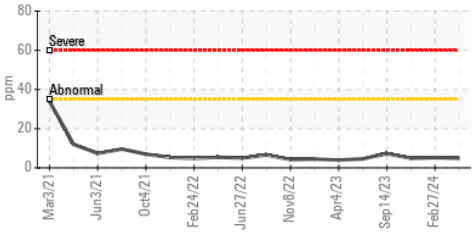

Chromium (ppm)



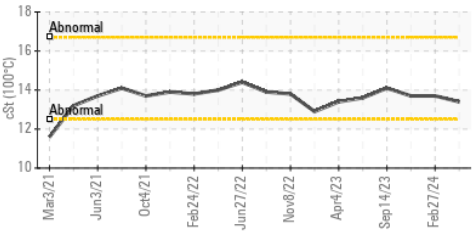

Copper (ppm)



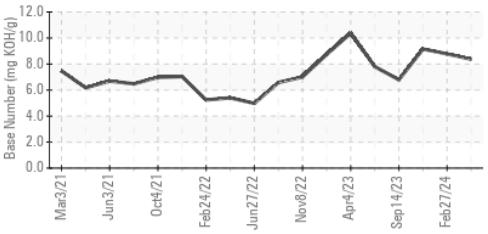

Silicon (ppm)




Viscosity @ 100°C




Base Number




ANAB ACCREDITED TESTING LABORATORY
Certificate L2367

**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513
**Sample No.** : RW0005400
**Lab Number** : 06177899
**Unique Number** : 11029225
**Test Package** : MOB 2

**Received** : 13 May 2024
**Tested** : 14 May 2024
**Diagnosed** : 14 May 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)*

**MICHIGAN WOOD CARRIERS**
P.O. BOX 337
VANDERBILT, MI
US 49795
Contact: STEVE WOLFE
sbeyer@ntimberlands.com
T: (989)983-2485
F: (989)983-9678