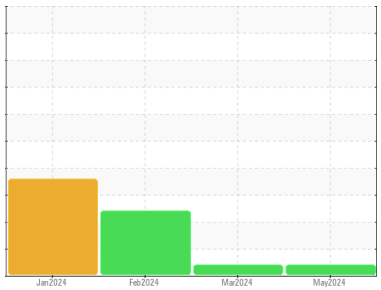
# OIL ANALYSIS REPORT

Area
**MINING**
Machine Id
**ME-61 CATERPILLAR 980M MK700210**
Component
**Diesel Engine**
Fluid
**CAT DEO ULS 15W40 (10 GAL)**

Sample Rating Trend




**VISCOSITY**

## DIAGNOSIS

**Recommendation**
The oil change at the time of sampling has been noted. Resample at the next service interval to monitor.

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

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

**Fluid Condition**
The oil viscosity is lower than normal. The BN result indicates that there is suitable alkalinity remaining in the oil. Confirm oil type.

| SAMPLE INFORMATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Sample Number | | Client Info | | **WC0910934** | WC0909672 | WC0909659 |
| Sample Date | | Client Info | | **01 May 2024** | 28 Mar 2024 | 28 Feb 2024 |
| Machine Age | hrs | Client Info | | **11790** | 11312 | 10782 |
| Oil Age | hrs | Client Info | | **500** | 500 | 500 |
| Oil Changed | | Client Info | | **Changed** | Changed | Changed |
| Sample Status | | | | **ATTENTION** | ATTENTION | ATTENTION |

| CONTAMINATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| 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 | >100 | **25** | 25 | 39 |
| Chromium | ppm | ASTM D5185m | >20 | **<1** | 1 | 2 |
| Nickel | ppm | ASTM D5185m | >2 | **<1** | 0 | <1 |
| Titanium | ppm | ASTM D5185m | >2 | **<1** | <1 | <1 |
| Silver | ppm | ASTM D5185m | >2 | **0** | 0 | 0 |
| Aluminum | ppm | ASTM D5185m | >25 | **2** | 2 | 4 |
| Lead | ppm | ASTM D5185m | >40 | **2** | 1 | 2 |
| Copper | ppm | ASTM D5185m | >330 | **4** | 3 | 5 |
| Tin | ppm | ASTM D5185m | >15 | **1** | <1 | <1 |
| Vanadium | ppm | ASTM D5185m | | **<1** | <1 | 0 |
| Cadmium | ppm | ASTM D5185m | | **<1** | 0 | 0 |

| ADDITIVES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Boron | ppm | ASTM D5185m | | **25** | 27 | 21 |
| Barium | ppm | ASTM D5185m | | **0** | 0 | 0 |
| Molybdenum | ppm | ASTM D5185m | | **41** | 42 | 72 |
| Manganese | ppm | ASTM D5185m | | **<1** | <1 | <1 |
| Magnesium | ppm | ASTM D5185m | | **445** | 440 | 488 |
| Calcium | ppm | ASTM D5185m | | **1625** | 1644 | 1542 |
| Phosphorus | ppm | ASTM D5185m | 1000 | **909** | 879 | 935 |
| Zinc | ppm | ASTM D5185m | 1090 | **1088** | 1052 | 1094 |
| Sulfur | ppm | ASTM D5185m | 3000 | **3330** | 2976 | 2997 |

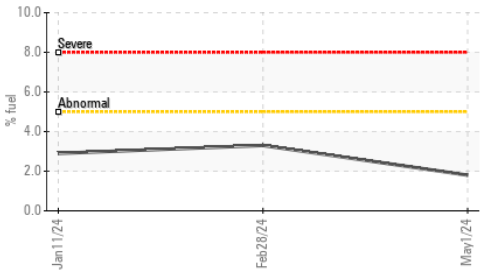
| CONTAMINANTS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Silicon | ppm | ASTM D5185m | >25 | **6** | 9 | 6 |
| Sodium | ppm | ASTM D5185m | | **19** | 29 | 207 |
| Potassium | ppm | ASTM D5185m | >20 | **3** | 4 | 17 |
| Fuel | % | ASTM D3524 | >5 | **1.8** | <1.0 | 3.3 |

| INFRA-RED | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Soot % | % | *ASTM D7844 | >3 | **0.6** | 0.5 | 0.7 |
| Nitration | Abs/cm | *ASTM D7624 | >20 | **9.6** | 8.8 | 10.9 |
| Sulfation | Abs/.1mm | *ASTM D7415 | >30 | **23.0** | 22.6 | 24.0 |

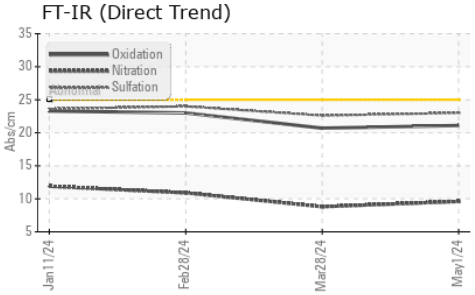
| FLUID DEGRADATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Oxidation | Abs/.1mm | *ASTM D7414 | >25 | **21.1** | 20.7 | 23.0 |
| Base Number (BN) | mg KOH/g | ASTM D2896 | 10.4 | **8.9** | 9.4 | 8.2 |

# OIL ANALYSIS REPORT

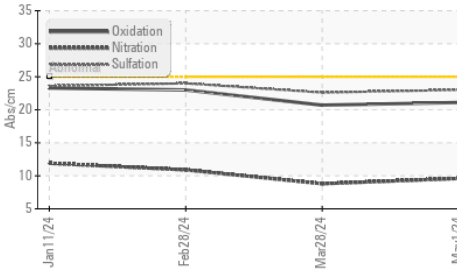
Fuel Dilution



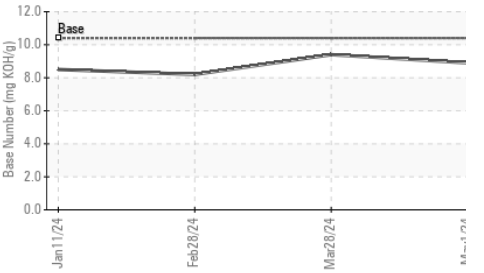

FT-IR (Direct Trend)




FT-IR (Direct Trend)




Base Number

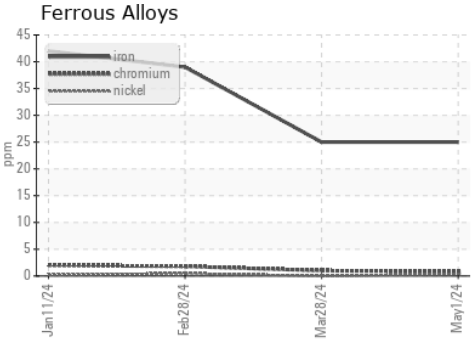



| VISUAL | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| White Metal | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Yellow Metal | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Precipitate | scalar | *Visual | NONE | **NONE** | NONE | NONE |
|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

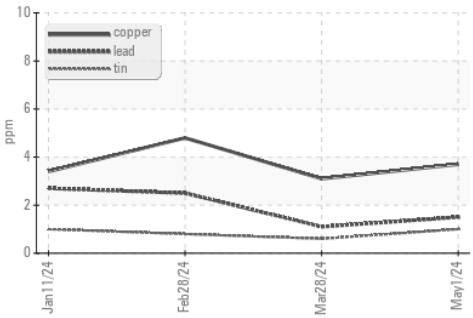
| FLUID PROPERTIES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Visc @ 100°C | cSt | ASTM D445 | 15.0 | **10.8** | 11.4 | 11.1 |

## GRAPHS

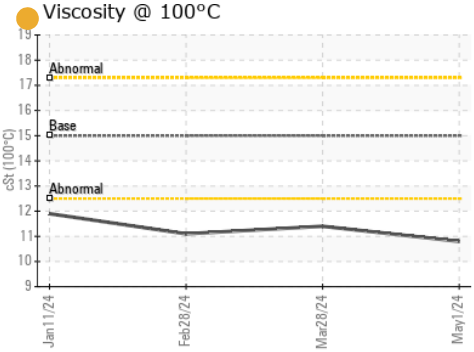
Ferrous Alloys



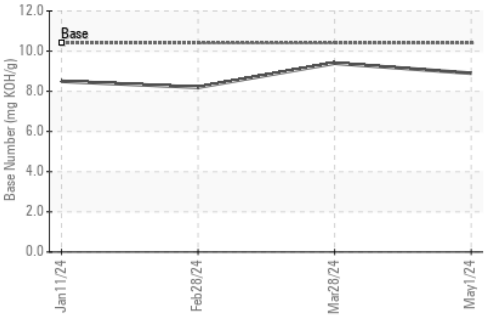

Non-ferrous Metals




Viscosity @ 100°C




Base Number




Certificate L2367

**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513
**Sample No.** : WC0910934 **Received** : 13 May 2024
**Lab Number** : 06178089 **Tested** : 17 May 2024
**Unique Number** : 11029415 **Diagnosed** : 17 May 2024 - Jonathan Hester
**Test Package** : CONST ( Additional Tests: FuelDilution, PercentFuel, 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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