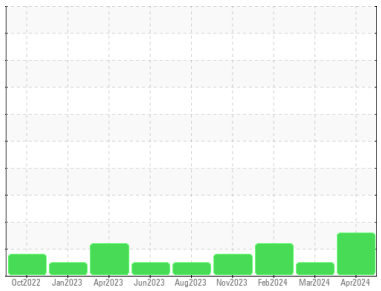
# OIL ANALYSIS REPORT

Sample Rating Trend




ISO

Machine Id
## CATERPILLAR 980M 6141 (S/N KRS00885)
Component
**Hydraulic System**
Fluid
**TULCO LUBSOIL SUPER HYDRAULIC HZ 46 (75 GAL)**

## DIAGNOSIS

**Recommendation**
No corrective action is recommended at this time. The filter 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**
There is a high amount of particulates present in the oil.

**Fluid Condition**
The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

| SAMPLE INFORMATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Sample Number | | Client Info | | **TO10002043** | TO10003374 | TO10002988 |
| Sample Date | | Client Info | | **08 Apr 2024** | 04 Mar 2024 | 01 Feb 2024 |
| Machine Age | hrs | Client Info | | **13425** | 13158 | 12901 |
| Oil Age | hrs | Client Info | | **1249** | 982 | 725 |
| Oil Changed | | Client Info | | **Not Changd** | Not Changd | Not Changd |
| Sample Status | | | | **ABNORMAL** | NORMAL | ABNORMAL |

| WEAR METALS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Iron | ppm | ASTM D5185m | >20 | **2** | 3 | 2 |
| Chromium | ppm | ASTM D5185m | >20 | **0** | 0 | <1 |
| Nickel | ppm | ASTM D5185m | >20 | **0** | 0 | 0 |
| Titanium | ppm | ASTM D5185m | | **0** | 0 | 0 |
| Silver | ppm | ASTM D5185m | | **0** | 0 | 0 |
| Aluminum | ppm | ASTM D5185m | >20 | **0** | 0 | 2 |
| Lead | ppm | ASTM D5185m | >20 | **0** | 0 | 0 |
| Copper | ppm | ASTM D5185m | >20 | **3** | 2 | 3 |
| Tin | ppm | ASTM D5185m | >20 | **0** | 0 | 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** | 0 | 0 |
| Barium | ppm | ASTM D5185m | | **0** | 0 | 5 |
| Molybdenum | ppm | ASTM D5185m | | **0** | <1 | 0 |
| Manganese | ppm | ASTM D5185m | | **0** | 0 | 0 |
| Magnesium | ppm | ASTM D5185m | | **146** | 152 | 176 |
| Calcium | ppm | ASTM D5185m | | **429** | 453 | 493 |
| Phosphorus | ppm | ASTM D5185m | | **675** | 740 | 720 |
| Zinc | ppm | ASTM D5185m | | **774** | 800 | 950 |
| Sulfur | ppm | ASTM D5185m | | **2760** | 3054 | 3158 |

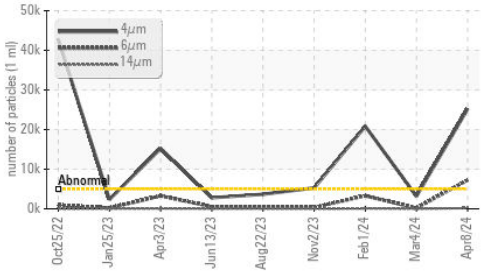
| CONTAMINANTS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Silicon | ppm | ASTM D5185m | >15 | **2** | 2 | 1 |
| Sodium | ppm | ASTM D5185m | | **5** | 4 | 0 |
| Potassium | ppm | ASTM D5185m | >20 | **0** | 0 | 2 |
| Water | % | ASTM D6304 | >0.05 | **NEG** | NEG | NEG |
| ppm Water | ppm | ASTM D6304 | >500 | **---** | --- | --- |

| FLUID CLEANLINESS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Particles >4µm | | ASTM D7647 | >5000 | ▲ **25224** | 3164 | ▲ 20824 |
| Particles >6µm | | ASTM D7647 | >1300 | ▲ **7266** | 192 | ▲ 3284 |
| Particles >14µm | | ASTM D7647 | >160 | ▲ **162** | 11 | 84 |
| Particles >21µm | | ASTM D7647 | >40 | **12** | 3 | 14 |
| Particles >38µm | | ASTM D7647 | >10 | **1** | 0 | 0 |
| Particles >71µm | | ASTM D7647 | >3 | **0** | 0 | 0 |
| Oil Cleanliness | | ISO 4406 (c) | >19/17/14 | ▲ **22/20/15** | 19/15/11 | ▲ 22/19/14 |

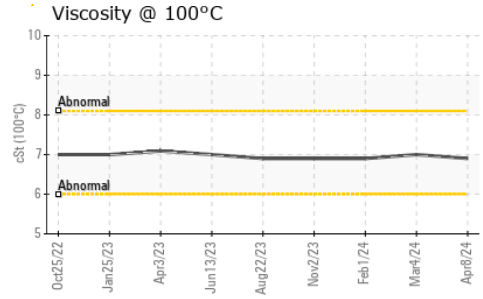
| FLUID DEGRADATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Acid Number (AN) | mg KOH/g | ASTM D8045 | | **0.77** | 0.72 | 0.70 |

# OIL ANALYSIS REPORT

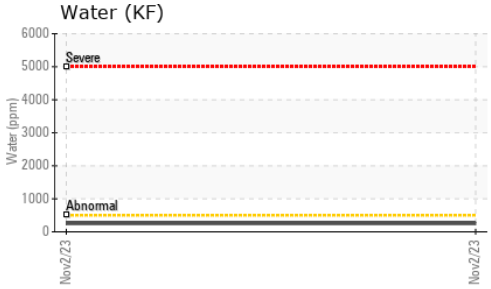
Particle Trend



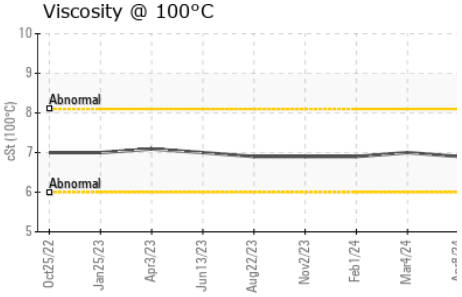

Viscosity @ 100°C



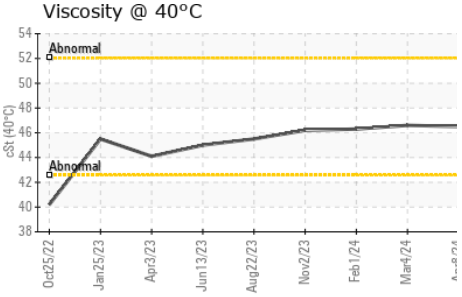

Water (KF)




Viscosity @ 100°C



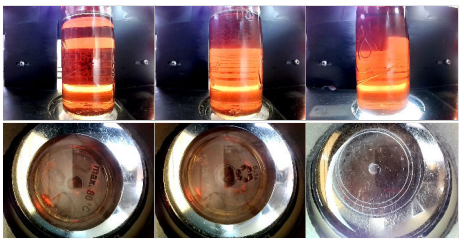

Viscosity @ 40°C




| 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 | >0.05 | **NEG** | NEG | NEG |
| Free Water | scalar | *Visual | | **NEG** | NEG | NEG |

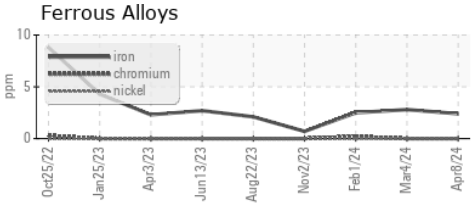
| FLUID PROPERTIES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Visc @ 40°C | cSt | ASTM D445 | | **46.5** | 46.6 | 46.3 |
| Visc @ 100°C | cSt | ASTM D445 | | **6.9** | 7.0 | 6.9 |
| Viscosity Index (VI) | Scale | ASTM D2270 | | **103** | 107 | 104 |

| SAMPLE IMAGES | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|
| Color | | | | | |
| Bottom | | | | | |

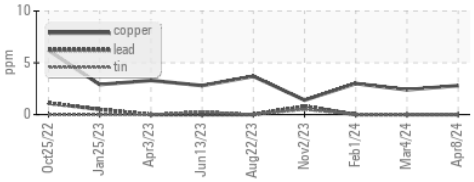


## GRAPHS

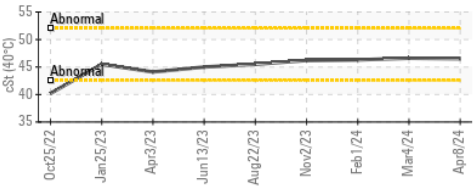
Ferrous Alloys



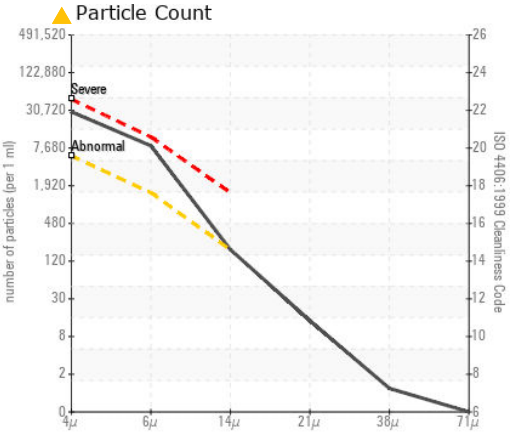

Non-ferrous Metals



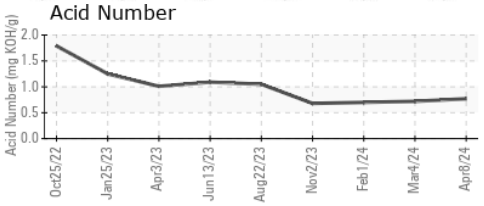

Viscosity @ 40°C




Particle Count




Acid Number




Certificate L2367

**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513
**Sample No.** : TO10002043 **Received** : 15 Apr 2024
**Lab Number** : 06149510 **Tested** : 17 Apr 2024
**Unique Number** : 10979588 **Diagnosed** : 17 Apr 2024 - Don Baldridge
**Test Package** : MOB 2 ( Additional Tests: KF, KV100, VI )

*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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Submitted By: SKIP SAENGERHAUSEN