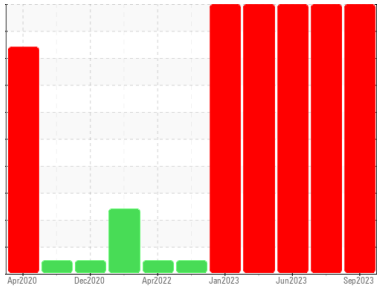
# OIL ANALYSIS REPORT

Machine Id
**CATERPILLAR 420 FST BACKHOE 6010 (S/N SKR04232)**
Component
**Front Right Planetary**
Fluid
**TULCO LUBSOIL TO-4 50 (0 GAL)**

Sample Rating Trend




**WEAR**

## DIAGNOSIS

**Recommendation**
We advise that you check for the source of water entry. We advise that you check all areas where dirt can enter the system. The oil change at the time of sampling has been noted. We advise that you inspect for the source(s) of wear. We recommend an early resample to monitor this condition.

**Wear**
Gear wear is indicated.

**Contamination**
There is a high concentration of water present in the oil. Elemental levels of silicon (Si) and aluminum (Al) indicate alumina-silicate (coarse dirt) ingress.

**Fluid Condition**
The AN level is acceptable for this fluid. The oil is no longer serviceable due to the presence of contaminants.

| SAMPLE INFORMATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Sample Number | | Client Info | | **TO10002082** | TO10002414 | TO10002364 |
| Sample Date | | Client Info | | **18 Sep 2023** | 25 Jul 2023 | 01 Jun 2023 |
| Machine Age | hrs | Client Info | | **12601** | 12310 | 12039 |
| Oil Age | hrs | Client Info | | **291** | 271 | 139 |
| Oil Changed | | Client Info | | **Changed** | Changed | Changed |
| Sample Status | | | | **SEVERE** | SEVERE | SEVERE |

| WEAR METALS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| PQ | | ASTM D8184 | | **1325** | 1396 | 1432 |
| Iron | ppm | ASTM D5185m | >150 | **5217** | 2665 | 2397 |
| Chromium | ppm | ASTM D5185m | >10 | **32** | 16 | 17 |
| Nickel | ppm | ASTM D5185m | >10 | **14** | 2 | 3 |
| Titanium | ppm | ASTM D5185m | | **51** | 38 | 58 |
| Silver | ppm | ASTM D5185m | | **0** | 0 | 0 |
| Aluminum | ppm | ASTM D5185m | >25 | **788** | 444 | 653 |
| Lead | ppm | ASTM D5185m | >100 | **14** | 9 | 8 |
| Copper | ppm | ASTM D5185m | >50 | **27** | 13 | 19 |
| Tin | ppm | ASTM D5185m | >10 | **0** | 4 | 8 |
| Vanadium | ppm | ASTM D5185m | | **2** | 1 | 2 |
| Cadmium | ppm | ASTM D5185m | | **<1** | <1 | <1 |

| ADDITIVES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Boron | ppm | ASTM D5185m | | **34** | 7 | 9 |
| Barium | ppm | ASTM D5185m | | **10** | 0 | 7 |
| Molybdenum | ppm | ASTM D5185m | | **0** | <1 | <1 |
| Manganese | ppm | ASTM D5185m | | **52** | 29 | 37 |
| Magnesium | ppm | ASTM D5185m | | **1032** | 730 | 1013 |
| Calcium | ppm | ASTM D5185m | | **11610** | 10000 | 10000 |
| Phosphorus | ppm | ASTM D5185m | | **1310** | 957 | 852 |
| Zinc | ppm | ASTM D5185m | | **1547** | 1090 | 911 |
| Sulfur | ppm | ASTM D5185m | | **9473** | 6168 | 5610 |

| CONTAMINANTS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Silicon | ppm | ASTM D5185m | >50 | **4047** | 2752 | 3947 |
| Sodium | ppm | ASTM D5185m | | **98** | 60 | 79 |
| Potassium | ppm | ASTM D5185m | >20 | **329** | 219 | 303 |
| Water | % | ASTM D6304 | >0.1 | **2.92** | 3.54 | 6.132 |
| ppm Water | ppm | ASTM D6304 | >1000 | **29200** | 35400 | 61320 |

| FLUID DEGRADATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Acid Number (AN) | mg KOH/g | ASTM D8045 | | **1.34** | 1.37 | 1.45 |

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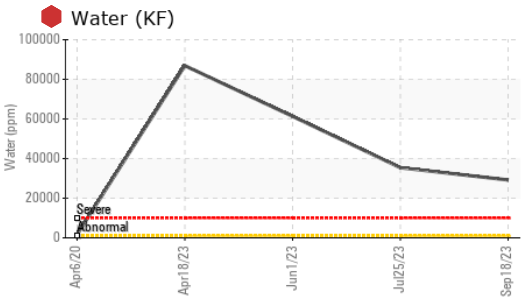
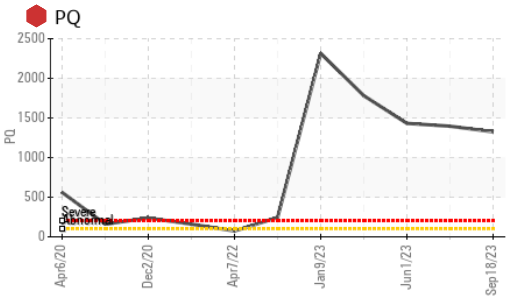
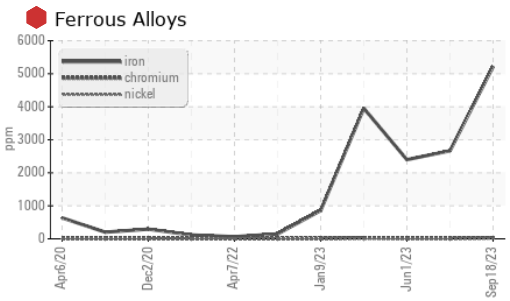
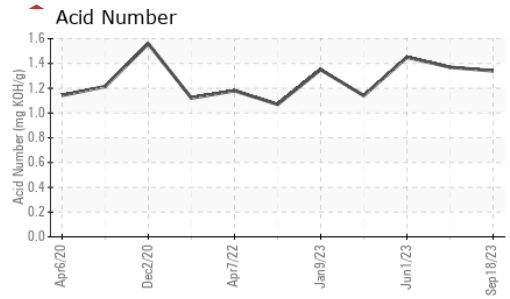
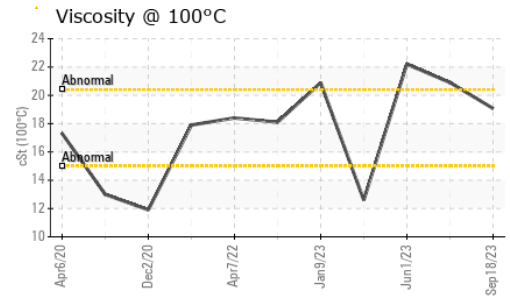


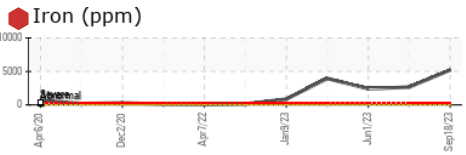



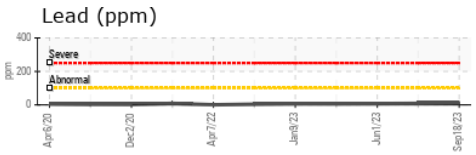

| VISUAL | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| White Metal | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Yellow Metal | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Precipitate | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| 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** | ▲ HAZY | ▲ HAZY |
| Odor | scalar | *Visual | NORML | **NORML** | NORML | NORML |
| Emulsified Water | scalar | *Visual | >0.1 | ⬢ **0.2%** | ⬢ 0.2% | ▲ 0.2% |
| Free Water | scalar | *Visual | | **NEG** | NEG | NEG |

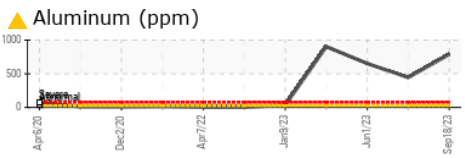
| FLUID PROPERTIES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Visc @ 40°C | cSt | ASTM D445 | | **240** | 249 | ▲ 298 |
| Visc @ 100°C | cSt | ASTM D445 | | **19.07** | 20.9 | ▲ 22.2 |
| Viscosity Index (VI) | Scale | ASTM D2270 | | **89** | 98 | 90 |

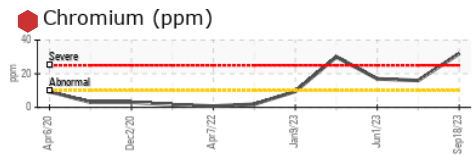
| SAMPLE IMAGES | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|
| Color | | | *no image* | *no image* | *no image* |
| Bottom | | | *no image* | *no image* | *no image* |

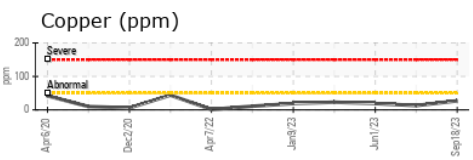
## GRAPHS

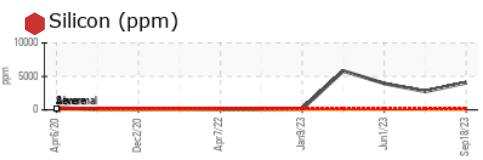


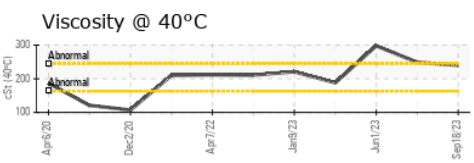



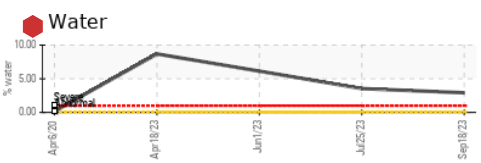




Certificate L2367

**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513
**Sample No.** : TO10002082 **Received** : 25 Sep 2023
**Lab Number** : 05960729 **Diagnosed** : 29 Sep 2023
**Unique Number** : 10661942 **Diagnostician** : Jonathan Hester
**Test Package** : MOB 2 ( Additional Tests: KF, KV100, PQ, 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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