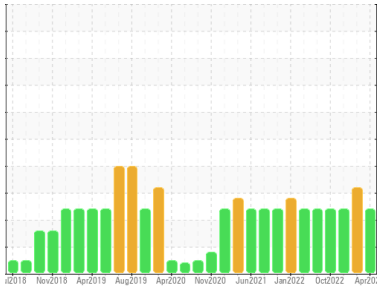
# OIL ANALYSIS REPORT

Machine Id
## CATERPILLAR D6T 8170 (S/N JML00456)
Component
**Hydraulic System**
Fluid
**TDH FLUID SAE 70W80 (--- GAL)**

Sample Rating Trend



**DIRT**

## DIAGNOSIS

**Recommendation**
We advise that you check all areas where dirt can enter the system. 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**
Elemental levels of silicon (Si) and aluminum (Al) indicate alumina-silicate (coarse dirt) ingress. The amount and size of particulates present in the system are acceptable.

**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 | | **WC0913180** | WC0790964 | WC0713076 |
| Sample Date | | Client Info | | **08 Apr 2024** | 15 May 2023 | 12 Dec 2022 |
| Machine Age | hrs | Client Info | | **15227** | 14605 | 14138 |
| Oil Age | hrs | Client Info | | **15227** | 14605 | 14138 |
| Oil Changed | | Client Info | | **Not Changd** | Not Changd | Not Changd |
| Sample Status | | | | **ABNORMAL** | ABNORMAL | ABNORMAL |

| CONTAMINATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Water | | WC Method | >0.1 | **NEG** | NEG | NEG |

| WEAR METALS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Iron | ppm | ASTM D5185m | >20 | **21** | 19 | 17 |
| Chromium | ppm | ASTM D5185m | >10 | **2** | 2 | 2 |
| Nickel | ppm | ASTM D5185m | >10 | **<1** | <1 | 0 |
| Titanium | ppm | ASTM D5185m | | **2** | 1 | 1 |
| Silver | ppm | ASTM D5185m | | **<1** | 0 | <1 |
| Aluminum | ppm | ASTM D5185m | >10 | **27** | 23 | 28 |
| Lead | ppm | ASTM D5185m | >10 | **3** | 2 | 2 |
| Copper | ppm | ASTM D5185m | >75 | **18** | 12 | 11 |
| Tin | ppm | ASTM D5185m | >10 | **1** | <1 | <1 |
| Vanadium | ppm | ASTM D5185m | | **<1** | 0 | <1 |
| Cadmium | ppm | ASTM D5185m | | **<1** | <1 | 0 |

| ADDITIVES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Boron | ppm | ASTM D5185m | 10 | **88** | 90 | 90 |
| Barium | ppm | ASTM D5185m | 10 | **0** | 0 | 0 |
| Molybdenum | ppm | ASTM D5185m | 10 | **5** | 5 | 4 |
| Manganese | ppm | ASTM D5185m | | **1** | <1 | <1 |
| Magnesium | ppm | ASTM D5185m | 100 | **45** | 55 | 56 |
| Calcium | ppm | ASTM D5185m | 3500 | **2509** | 2969 | 2886 |
| Phosphorus | ppm | ASTM D5185m | 1150 | **1047** | 986 | 959 |
| Zinc | ppm | ASTM D5185m | 1150 | **1118** | 1251 | 1180 |
| Sulfur | ppm | ASTM D5185m | 5000 | **3059** | 3337 | 3429 |

| CONTAMINANTS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Silicon | ppm | ASTM D5185m | >20 | **54** | 53 | 52 |
| Sodium | ppm | ASTM D5185m | | **3** | 6 | 6 |
| Potassium | ppm | ASTM D5185m | >20 | **6** | 6 | 3 |

| FLUID CLEANLINESS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Particles >4µm | | ASTM D7647 | >5000 | **3661** | 8373 | 4685 |
| Particles >6µm | | ASTM D7647 | >1300 | **338** | 338 | 310 |
| Particles >14µm | | ASTM D7647 | >160 | **19** | 42 | 18 |
| Particles >21µm | | ASTM D7647 | >40 | **5** | 10 | 6 |
| Particles >38µm | | ASTM D7647 | >10 | **0** | 1 | 0 |
| Particles >71µm | | ASTM D7647 | >3 | **0** | 0 | 0 |
| Oil Cleanliness | | ISO 4406 (c) | >19/17/14 | **19/16/11** | 20/16/13 | 19/15/11 |

| FLUID DEGRADATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Acid Number (AN) | mg KOH/g | ASTM D8045 | 2.25 | **1.00** | 0.90 | 0.96 |

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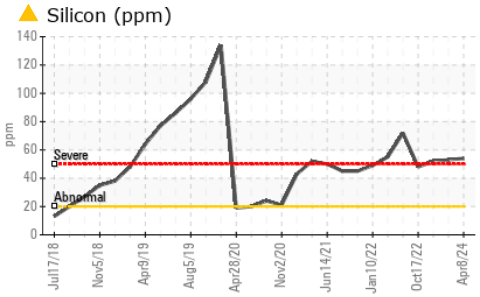
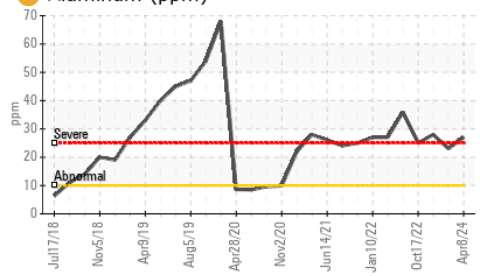
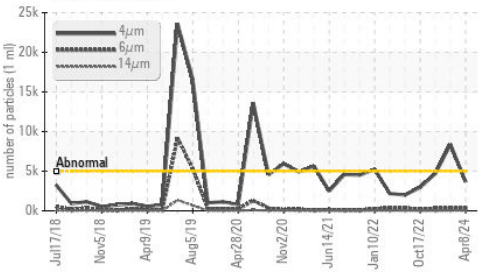
Silicon (ppm)



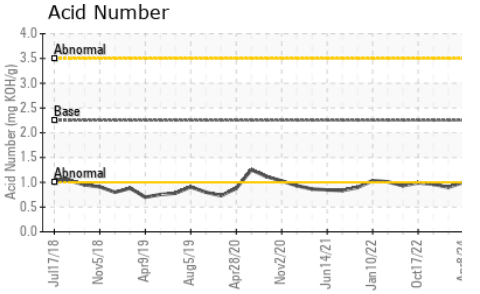

Aluminum (ppm)



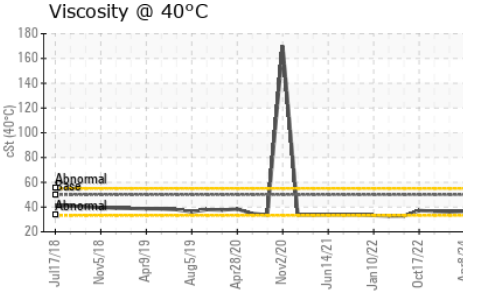

Particle Trend




Acid Number

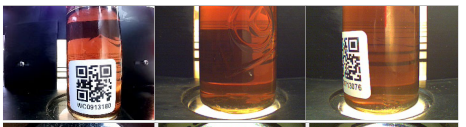



Viscosity @ 40°C



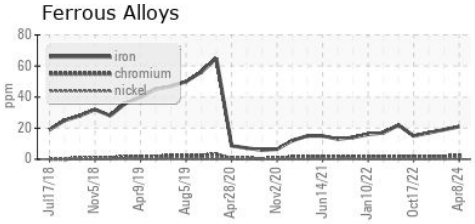

| VISUAL | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| White Metal | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Yellow Metal | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Precipitate | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| 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 | >0.1 | **NEG** | NEG | NEG |
| Free Water | scalar | *Visual | | **NEG** | NEG | NEG |

| FLUID PROPERTIES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Visc @ 40°C | cSt | ASTM D445 | 50 | **36.6** | 36.1 | 36.6 |

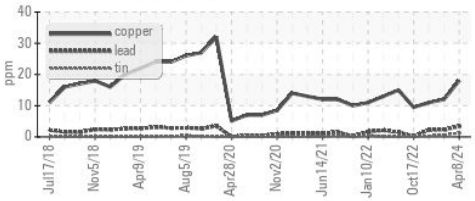
| SAMPLE IMAGES | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|
| Color | | |  | | |
| Bottom | | |  | | |

## GRAPHS

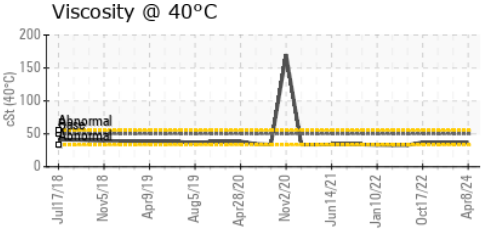
Ferrous Alloys



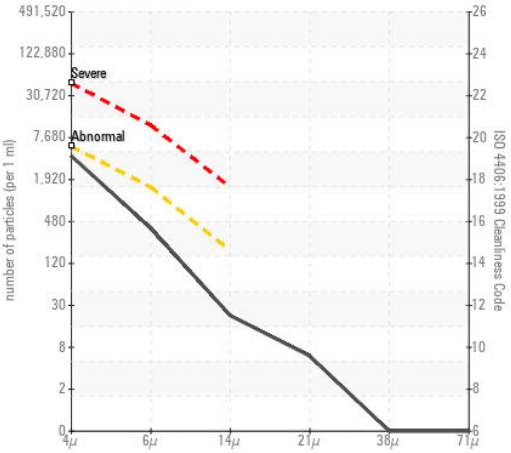

Non-ferrous Metals



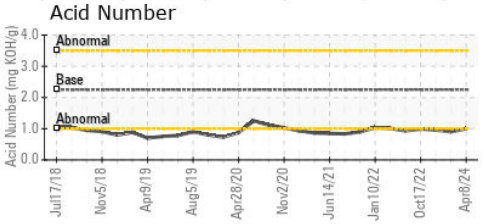

Viscosity @ 40°C




Particle Count




Acid Number




**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513
**Sample No.** : WC0913180
**Lab Number** : 06147245
**Unique Number** : 10977323
**Test Package** : CONST

**Received** : 12 Apr 2024
**Tested** : 15 Apr 2024
**Diagnosed** : 16 Apr 2024 - Don Baldridge

Certificate L2367

*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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