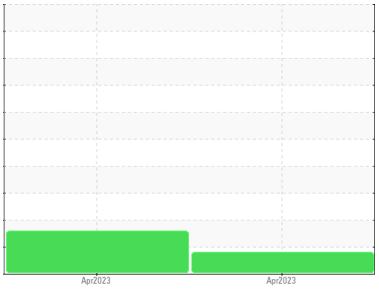
# OIL ANALYSIS REPORT

Sample Rating Trend




ISO

Area
**RIG 879**
Machine Id
**R879-P-03**
Component
**Pump Drive**
Fluid
**NOT GIVEN (--- GAL)**

## DIAGNOSIS

**Recommendation**
No corrective action is recommended at this time. Resample at the next service interval to monitor. Please specify the brand, type, and viscosity of the oil on your next sample.

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

**Contamination**
There is a high amount of silt (particulates < 14 microns in size) 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 | | **KL0009706** | KL0011838 | --- |
| Sample Date | | Client Info | | **19 Apr 2023** | 16 Apr 2023 | --- |
| Machine Age | days | Client Info | | **45035** | 45027 | --- |
| Oil Age | days | Client Info | | **0** | 0 | --- |
| Oil Changed | | Client Info | | **Not Changd** | N/A | --- |
| Sample Status | | | | **ABNORMAL** | ABNORMAL | --- |

| WEAR METALS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Iron | ppm | ASTM D5185m | >500 | **18** | 26 | --- |
| Chromium | ppm | ASTM D5185m | >7 | **0** | 0 | --- |
| Nickel | ppm | ASTM D5185m | | **0** | 0 | --- |
| Titanium | ppm | ASTM D5185m | | **0** | 0 | --- |
| Silver | ppm | ASTM D5185m | | **0** | 0 | --- |
| Aluminum | ppm | ASTM D5185m | >25 | **3** | 4 | --- |
| Lead | ppm | ASTM D5185m | >35 | **0** | 0 | --- |
| Copper | ppm | ASTM D5185m | >50 | **<1** | 1 | --- |
| Tin | ppm | ASTM D5185m | >5 | **0** | 0 | --- |
| Vanadium | ppm | ASTM D5185m | | **0** | 0 | --- |
| Cadmium | ppm | ASTM D5185m | | **0** | 0 | --- |

| ADDITIVES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Boron | ppm | ASTM D5185m | | **<1** | 1 | --- |
| Barium | ppm | ASTM D5185m | | **0** | 0 | --- |
| Molybdenum | ppm | ASTM D5185m | | **12** | 11 | --- |
| Manganese | ppm | ASTM D5185m | | **<1** | <1 | --- |
| Magnesium | ppm | ASTM D5185m | | **7** | 7 | --- |
| Calcium | ppm | ASTM D5185m | | **598** | 647 | --- |
| Phosphorus | ppm | ASTM D5185m | | **36** | 39 | --- |
| Zinc | ppm | ASTM D5185m | | **11** | 13 | --- |
| Sulfur | ppm | ASTM D5185m | | **9499** | 9515 | --- |

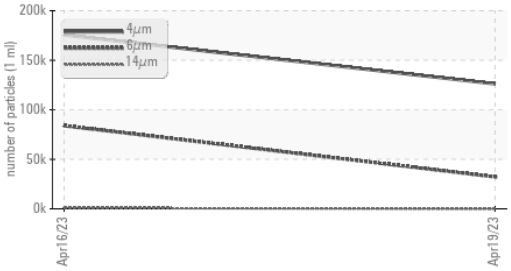
| CONTAMINANTS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Silicon | ppm | ASTM D5185m | >50 | **16** | 20 | --- |
| Sodium | ppm | ASTM D5185m | | **96** | 104 | --- |
| Potassium | ppm | ASTM D5185m | >20 | **0** | <1 | --- |

| FLUID CLEANLINESS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Particles >4µm | | ASTM D7647 | | **126127** | 175547 | --- |
| Particles >6µm | | ASTM D7647 | >1300 | ▲ **32172** | ▲ 83918 | --- |
| Particles >14µm | | ASTM D7647 | >160 | **59** | ▲ 766 | --- |
| Particles >21µm | | ASTM D7647 | >40 | **4** | ▲ 46 | --- |
| Particles >38µm | | ASTM D7647 | >10 | **1** | 1 | --- |
| Particles >71µm | | ASTM D7647 | >3 | **0** | 0 | --- |
| Oil Cleanliness | | ISO 4406 (c) | >17/14 | ▲ **22/13** | ▲ 24/17 | --- |

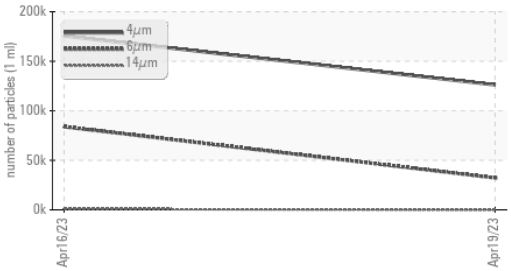
| FLUID DEGRADATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Acid Number (AN) | mg KOH/g | ASTM D8045 | | **0.135** | 0.093 | --- |

# OIL ANALYSIS REPORT

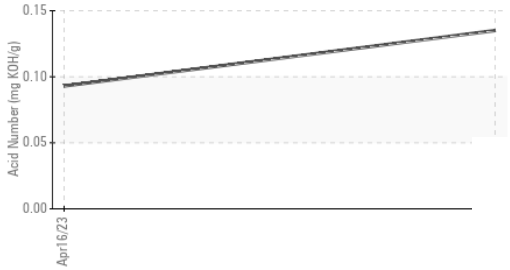
Particle Trend



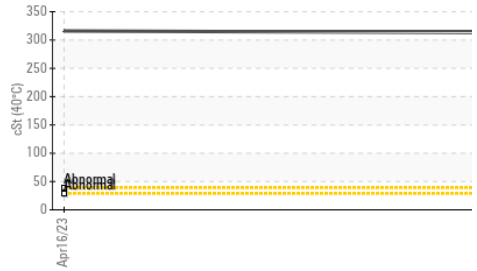

Particle Trend




Acid Number

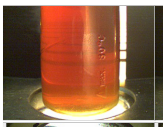
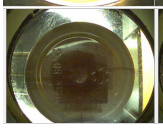
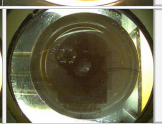



Viscosity @ 40°C



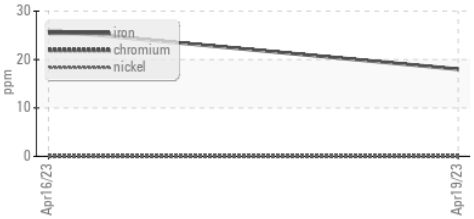

| VISUAL | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| White Metal | scalar | *Visual | NONE | **NONE** | NONE | --- |
| Yellow Metal | scalar | *Visual | NONE | **NONE** | NONE | --- |
| Precipitate | scalar | *Visual | NONE | **NONE** | NONE | --- |
| Silt | scalar | *Visual | NONE | **NONE** | NONE | --- |
| Debris | scalar | *Visual | NONE | **NONE** | NONE | --- |
| Sand/Dirt | scalar | *Visual | NONE | **NONE** | NONE | --- |
| Appearance | scalar | *Visual | NORML | **NORML** | NORML | --- |
| Odor | scalar | *Visual | NORML | **NORML** | NORML | --- |
| Emulsified Water | scalar | *Visual | | **NEG** | NEG | --- |
| Free Water | scalar | *Visual | | **NEG** | NEG | --- |

| FLUID PROPERTIES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Visc @ 40°C | cSt | ASTM D445 | | **313** | 316 | --- |

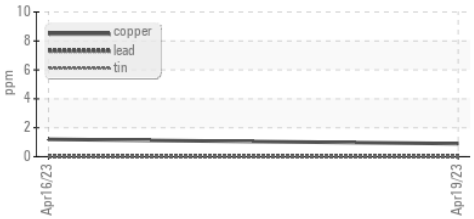
| SAMPLE IMAGES | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|
| Color | | |  |  | *no image* |
| Bottom | | |  |  | *no image* |

## GRAPHS

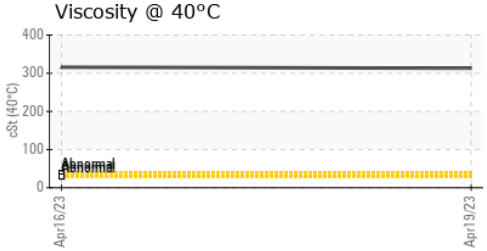
Ferrous Alloys



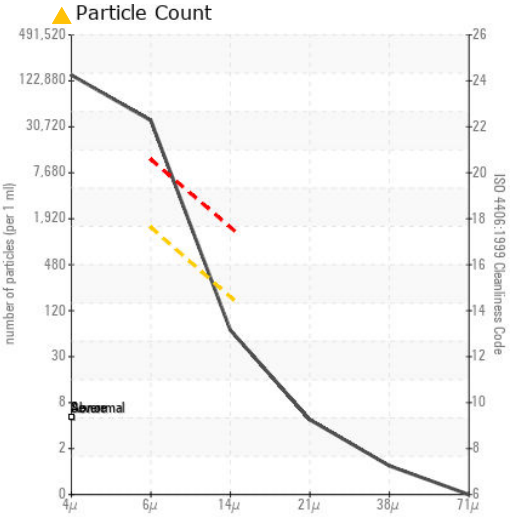

Non-ferrous Metals



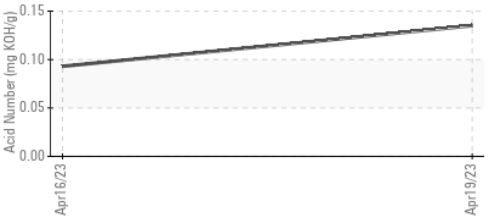

Viscosity @ 40°C




Particle Count




Acid Number




Certificate L2367

**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513
**Sample No.** : KL0009706 **Received** : 24 Apr 2023
**Lab Number** : 05827591 **Diagnosed** : 26 Apr 2023
**Unique Number** : 10441084 **Diagnostician** : Don Baldridge
**Test Package** : MOB 2 ( Additional Tests: PrtCount )

*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)*

**PATTERSON - UTI DRILLING**
9915 WEST INDUSTRIAL
MIDLAND, TX
US 79706
Contact: MICHEAL EASTMAN
micheal.eastman@patenergy.com
T: (325)716-8686
F: (432)561-9388