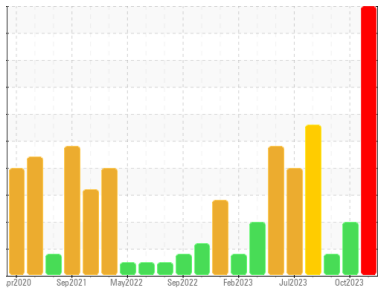
# OIL ANALYSIS REPORT

Sample Rating Trend



WEAR

Area
**RIG 3**
Machine Id
**WHITE STAR 2450 R3-P-01G-NKL**
Component
**Gearbox**
Fluid
**GEAR OIL ISO 460 (--- GAL)**

## DIAGNOSIS

**Recommendation**
We advise that you check all areas where dirt can enter the system. We advise that you inspect for the source(s) of wear. We recommend an early resample to monitor this condition.

**Wear**
A sharp increase in the iron level is noted. Gear wear is indicated.

**Contamination**
There is a moderate amount of particulates 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.

| SAMPLE INFORMATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Sample Number | | Client Info | | **KL0014064** | KL0013119 | KL0012953 |
| Sample Date | | Client Info | | **28 Dec 2023** | 27 Oct 2023 | 25 Sep 2023 |
| Machine Age | days | Client Info | | **45288** | 45225 | 45192 |
| Oil Age | days | Client Info | | **0** | 0 | 0 |
| Oil Changed | | Client Info | | **N/A** | N/A | N/A |
| Sample Status | | | | **SEVERE** | ABNORMAL | ABNORMAL |

| CONTAMINATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Water | | WC Method | >0.2 | **NEG** | NEG | NEG |

| WEAR METALS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Iron | ppm | ASTM D5185m | >200 | **637** | 209 | 188 |
| Chromium | ppm | ASTM D5185m | >10 | **4** | 1 | 1 |
| Nickel | ppm | ASTM D5185m | >10 | **4** | 1 | 1 |
| Titanium | ppm | ASTM D5185m | | **0** | 0 | <1 |
| Silver | ppm | ASTM D5185m | | **0** | 0 | 0 |
| Aluminum | ppm | ASTM D5185m | >25 | **22** | 8 | 5 |
| Lead | ppm | ASTM D5185m | >50 | **2** | 4 | 2 |
| Copper | ppm | ASTM D5185m | >200 | **111** | 131 | 59 |
| Tin | ppm | ASTM D5185m | >10 | **<1** | <1 | <1 |
| 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 | 50 | **21** | 18 | 14 |
| Barium | ppm | ASTM D5185m | 15 | **86** | 23 | 26 |
| Molybdenum | ppm | ASTM D5185m | 15 | **19** | 43 | 356 |
| Manganese | ppm | ASTM D5185m | | **4** | 1 | 1 |
| Magnesium | ppm | ASTM D5185m | 50 | **31** | 9 | 18 |
| Calcium | ppm | ASTM D5185m | 50 | **93** | 54 | 65 |
| Phosphorus | ppm | ASTM D5185m | 350 | **240** | 231 | 245 |
| Zinc | ppm | ASTM D5185m | 100 | **68** | 108 | 46 |
| Sulfur | ppm | ASTM D5185m | 12500 | **8509** | 7865 | 9383 |

| CONTAMINANTS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Silicon | ppm | ASTM D5185m | >50 | **114** | 39 | 29 |
| Sodium | ppm | ASTM D5185m | | **481** | 77 | 239 |
| Potassium | ppm | ASTM D5185m | >20 | **27** | 9 | 10 |

| FLUID CLEANLINESS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Particles >4µm | | ASTM D7647 | | **11858** | --- | --- |
| Particles >6µm | | ASTM D7647 | >5000 | **6459** | --- | --- |
| Particles >14µm | | ASTM D7647 | >640 | **1099** | --- | --- |
| Particles >21µm | | ASTM D7647 | >160 | **370** | --- | --- |
| Particles >38µm | | ASTM D7647 | >40 | **57** | --- | --- |
| Particles >71µm | | ASTM D7647 | >10 | **6** | --- | --- |
| Oil Cleanliness | | ISO 4406 (c) | >19/16 | **20/17** | --- | --- |

| FLUID DEGRADATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Acid Number (AN) | mg KOH/g | ASTM D8045 | 0.85 | **0.44** | 0.55 | 0.590 |

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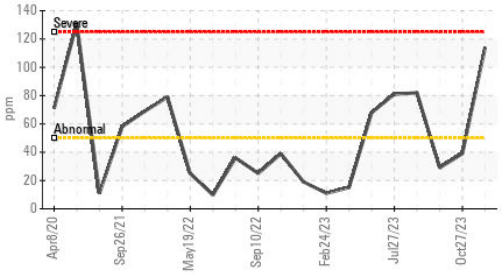
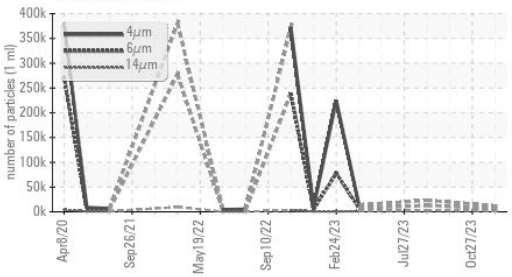
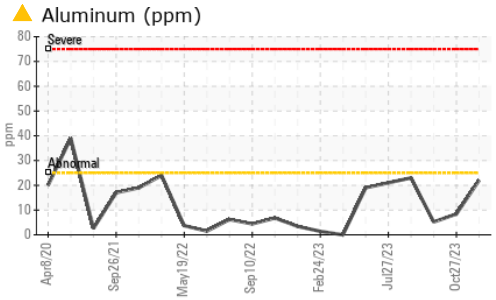
Silicon (ppm)



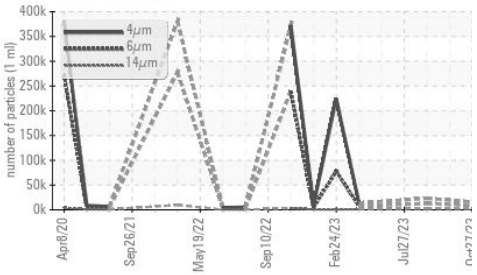

Particle Trend



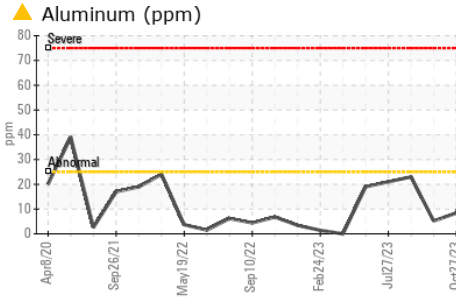

Aluminum (ppm)




Particle Trend




Aluminum (ppm)



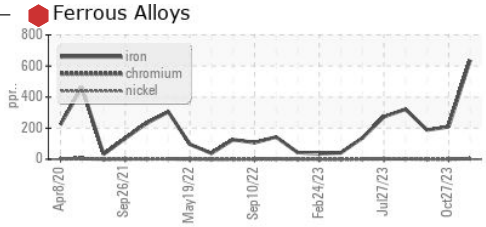

| VISUAL | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| White Metal | scalar | *Visual | NONE | **NONE** | ▲ MODER | NONE |
| Yellow Metal | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Precipitate | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Silt | scalar | *Visual | NONE | **NONE** | NONE | ▲ MODER |
| 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 @ 40°C | cSt | ASTM D445 | 460 | **443** | 444 | 417 |

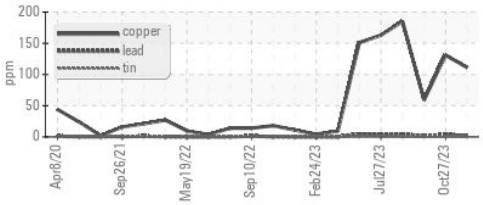
| SAMPLE IMAGES | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|
| Color | | |  | | |
| Bottom | | |  | | |

## GRAPHS

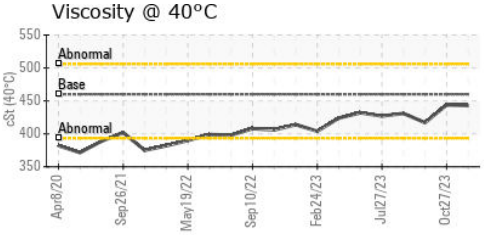
Ferrous Alloys



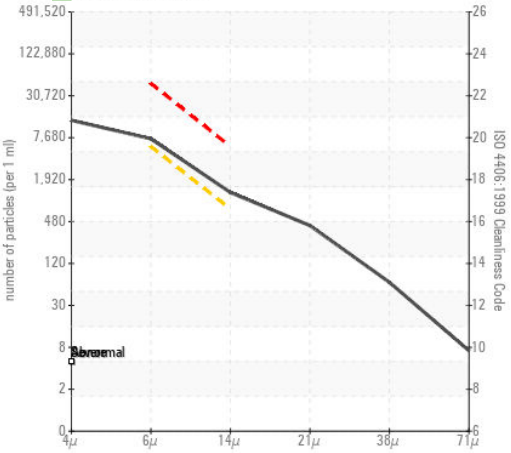

Non-ferrous Metals



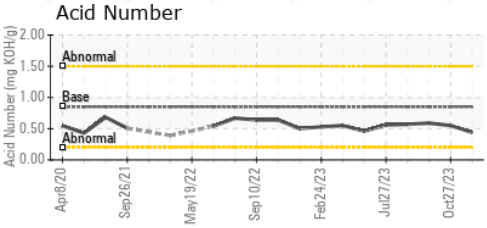

Viscosity @ 40°C




Particle Count




Acid Number




Certificate L2367

**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513
**Sample No.** : KL0014064 **Recieved** : 08 Jan 2024
**Lab Number** : 06054771 **Diagnosed** : 11 Jan 2024
**Unique Number** : 10820720 **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)*

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