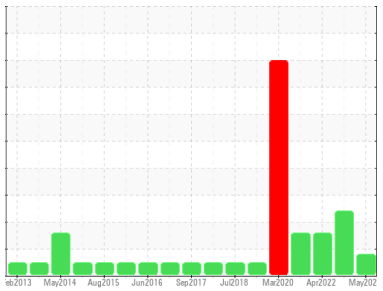
# OIL ANALYSIS REPORT

Sample Rating Trend



**WEAR**

Machine Id
## TURBINA 11 (S/N 101167)
Component
**Wind Turbine Gearbox**
Fluid
**FUCHS RENOLIN UNISYN CLP 320 (320 LTR)**

## DIAGNOSIS

**Recommendation**
No corrective action is recommended at this time. Resample at the next service interval to monitor.

**Wear**
The iron level is abnormal.

**Contamination**
There is no indication of any contamination in the oil. 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 | | **WC0831492** | WC0831541 | WC05582417 |
| Sample Date | | Client Info | | **03 May 2024** | 13 Aug 2023 | 08 Apr 2022 |
| Machine Age | yrs | Client Info | | **12** | 11 | 72 |
| Oil Age | yrs | Client Info | | **9** | 7 | 0 |
| Oil Changed | | Client Info | | **N/A** | N/A | N/A |
| Sample Status | | | | **ABNORMAL** | ABNORMAL | MARGINAL |

| WEAR METALS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| PQ | | ASTM D8184 | >50 | **21** | 14 | 19 |
| Iron | ppm | ASTM D5185m | >30 | ▲ **53** | ▲ 53 | 38 |
| Chromium | ppm | ASTM D5185m | >3 | **<1** | <1 | <1 |
| Nickel | ppm | ASTM D5185m | >3 | **<1** | <1 | 0 |
| Titanium | ppm | ASTM D5185m | >10 | **<1** | 0 | 0 |
| Silver | ppm | ASTM D5185m | | **0** | 0 | 0 |
| Aluminum | ppm | ASTM D5185m | >30 | **1** | 0 | <1 |
| Lead | ppm | ASTM D5185m | >15 | **<1** | <1 | <1 |
| Copper | ppm | ASTM D5185m | >10 | **<1** | 1 | <1 |
| Tin | ppm | ASTM D5185m | >10 | **<1** | 0 | 0 |
| Antimony | ppm | ASTM D5185m | >5 | **---** | --- | --- |
| Vanadium | ppm | ASTM D5185m | | **0** | 0 | 0 |
| Cadmium | ppm | ASTM D5185m | | **<1** | 0 | 0 |

| ADDITIVES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Boron | ppm | ASTM D5185m | | **0** | 0 | 0 |
| Barium | ppm | ASTM D5185m | | **1** | 2 | 0 |
| Molybdenum | ppm | ASTM D5185m | | **<1** | 0 | 0 |
| Manganese | ppm | ASTM D5185m | | **0** | 0 | <1 |
| Magnesium | ppm | ASTM D5185m | | **<1** | <1 | <1 |
| Calcium | ppm | ASTM D5185m | | **11** | 10 | 10 |
| Phosphorus | ppm | ASTM D5185m | | **214** | 214 | 176 |
| Zinc | ppm | ASTM D5185m | | **209** | 230 | 202 |
| Sulfur | ppm | ASTM D5185m | | **4494** | 5384 | 4439 |

| CONTAMINANTS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Silicon | ppm | ASTM D5185m | >+15 | **3** | 10 | <1 |
| Sodium | ppm | ASTM D5185m | | **4** | 1 | 3 |
| Potassium | ppm | ASTM D5185m | >20 | **2** | <1 | 0 |
| Water | % | ASTM D6304 | >0.02 | **0.011** | 0.02 | ▲ 0.021 |
| ppm Water | ppm | ASTM D6304 | >200 | **111** | 200.0 | ▲ 211.2 |

| FLUID CLEANLINESS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Particles >4µm | | ASTM D7647 | | **7056** | 56700 | 1684 |
| Particles >6µm | | ASTM D7647 | >5000 | **1591** | ▲ 15654 | 285 |
| Particles >14µm | | ASTM D7647 | >640 | **54** | ▲ 853 | 38 |
| Particles >21µm | | ASTM D7647 | >160 | **8** | ▲ 188 | 13 |
| Particles >38µm | | ASTM D7647 | >40 | **2** | 6 | 1 |
| Particles >71µm | | ASTM D7647 | >10 | **2** | 0 | 0 |
| Oil Cleanliness | | ISO 4406 (c) | >--/19/16 | **20/18/13** | ▲ 23/21/17 | 18/15/12 |

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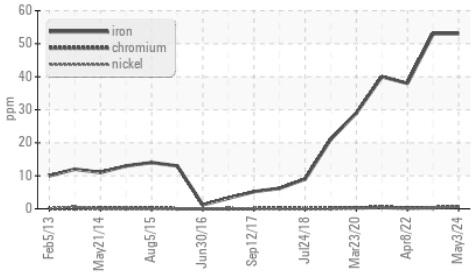
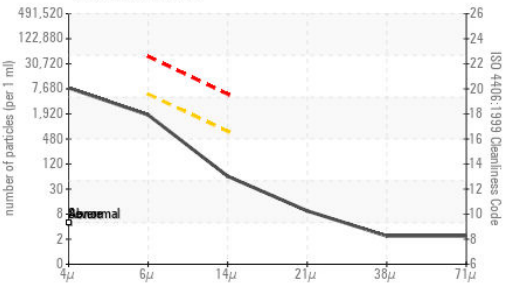
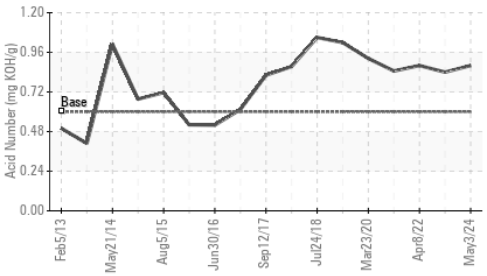
Ferrous Alloys



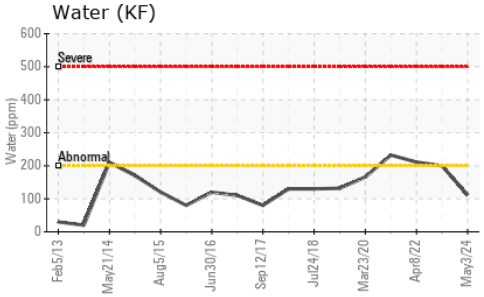

Particle Count



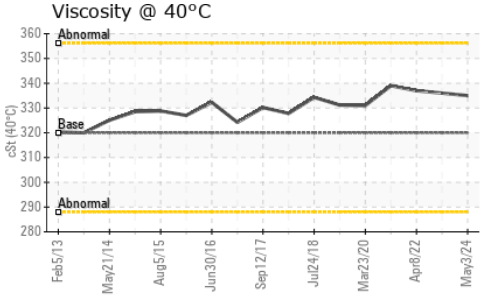

Acid Number




Water (KF)



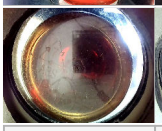
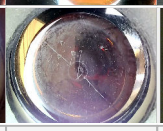
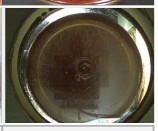

Viscosity @ 40°C




| FLUID DEGRADATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Acid Number (AN) | mg KOH/g | ASTM D8045 | 0.6 | **0.88** | 0.84 | 0.88 |

| VISUAL | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| White Metal | scalar | *Visual | NONE | **NONE** | LIGHT | 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 | >0.02 | **NEG** | NEG | NEG |
| Free Water | scalar | *Visual | | **NEG** | NEG | NEG |

| FLUID PROPERTIES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Visc @ 40°C | cSt | ASTM D445 | 320 | **335** | 336 | 337 |

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

**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513
**Sample No.** : WC0831492 **Received** : 29 May 2024
**Lab Number** : 06194662 **Tested** : 31 May 2024
**Unique Number** : 11056785 **Diagnosed** : 31 May 2024 - Angela Borella
**Test Package** : IND 2 ( Additional Tests: KF, PQ, PrtCount )

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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