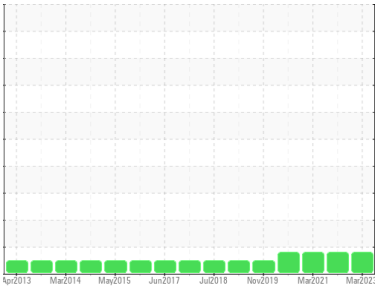
# PROBLEM SUMMARY

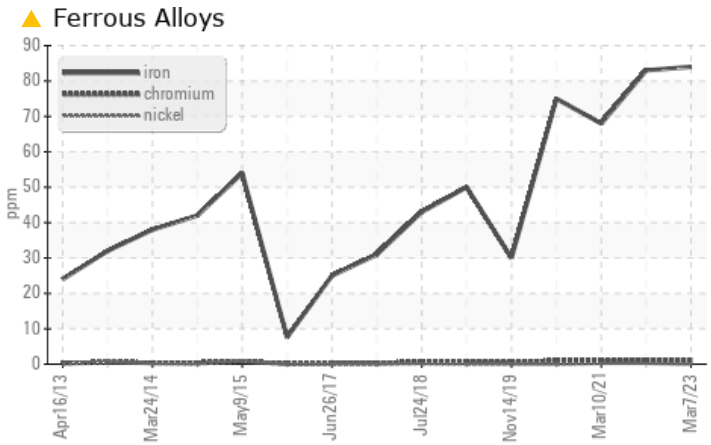
Sample Rating Trend



**WEAR**

Area
**9**
Machine Id
## WINERGY GEARBOX WTG-901 (S/N 4836491-0020-8)
Component
**Wind Turbine Gearbox**
Fluid
**FUCHS RENOLIN UNISYN CKC ISO 320 (340 LTR)**

## COMPONENT CONDITION SUMMARY




## RECOMMENDATION

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

## PROBLEMATIC TEST RESULTS

| Sample Status | | | | **ABNORMAL** | ABNORMAL | ABNORMAL |
|---|---|---|---|---|---|---|
| Iron | ppm | ASTM D5185m | >65 | ▲ **84** | ▲ 83 | ▲ 68 |

**Customer Id:** ENEFRA
**Sample No.:** WC0804523
**Lab Number:** 05857965
**Test Package:** IND 2

*To manage this report scan the QR code*

*To discuss the diagnosis or test data:*
Don Baldridge +1
don.b505@comcast.net

*To change component or sample information:*
Customer Service +1 1-800-237-1369
customerservice@wearcheck.com

## RECOMMENDED ACTIONS

*There are no recommended actions for this sample.*

## HISTORICAL DIAGNOSIS

**04 Feb 2022 Diag: Aaron Black**

WEAR

Resample at the next service interval to monitor.Iron ppm levels are abnormal. The low ferrous density (PQ) index indicates the wear metal levels are due to corrosion. Analytical ferrography: wear is normal with typical amounts of ferrous rubbing wear. The system cleanliness is acceptable for your target ISO 4406 cleanliness code. The water content is negligible. The system and fluid cleanliness is acceptable. Analytical ferrography: contamination is normal with typical amounts of external debris present. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

view report

**10 Mar 2021 Diag: Jonathan Hester**

WEAR

No corrective action is recommended at this time. Resample at the next service interval to monitor.The iron level is abnormal. The system cleanliness is acceptable for your target ISO 4406 cleanliness code. The water content is negligible. The system and fluid cleanliness is acceptable. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

view report

**27 Jul 2020 Diag: Doug Bogart**

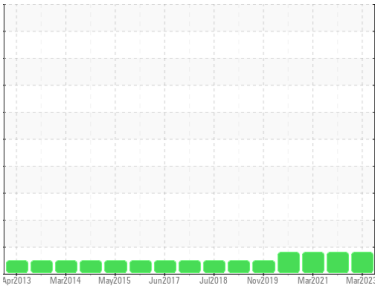
WEAR

No corrective action is recommended at this time. Resample at the next service interval to monitor.The iron level is abnormal. The system cleanliness is acceptable for your target ISO 4406 cleanliness code. The water content is negligible. The system and fluid cleanliness is acceptable. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

view report

# OIL ANALYSIS REPORT

Sample Rating Trend



**WEAR**

Area
**9**
Machine Id
## WINERGY GEARBOX WTG-901 (S/N 4836491-0020-8)
Component
**Wind Turbine Gearbox**
Fluid
**FUCHS RENOLIN UNISYN CKC ISO 320 (340 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. All other component wear rates are normal.

**Contamination**
The system cleanliness is acceptable for your target ISO 4406 cleanliness code. The water content is negligible. The system and fluid cleanliness is 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 | | **WC0804523** | WC05504537 | WC0547233 |
| Sample Date | | Client Info | | **07 Mar 2023** | 04 Feb 2022 | 10 Mar 2021 |
| Machine Age | yrs | Client Info | | **7** | 73 | 120 |
| Oil Age | yrs | Client Info | | **7** | 0 | 65 |
| Oil Changed | | Client Info | | **Not Changd** | N/A | Not Changd |
| Sample Status | | | | **ABNORMAL** | ABNORMAL | ABNORMAL |

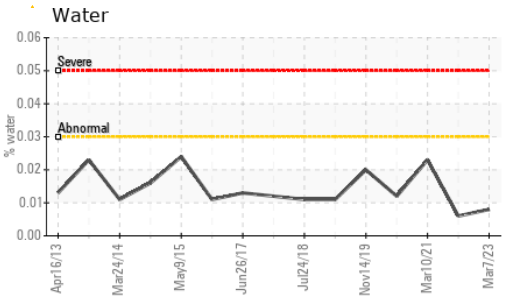
| WEAR METALS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| PQ | | ASTM D8184 | >50 | **16** | 14 | 16 |
| Iron | ppm | ASTM D5185m | >65 | ▲ **84** | ▲ 83 | ▲ 68 |
| Chromium | ppm | ASTM D5185m | >3 | **1** | 1 | <1 |
| Nickel | ppm | ASTM D5185m | >3 | **0** | <1 | <1 |
| Titanium | ppm | ASTM D5185m | >10 | **0** | 0 | 0 |
| Silver | ppm | ASTM D5185m | | **0** | <1 | 0 |
| Aluminum | ppm | ASTM D5185m | >10 | **<1** | 0 | 0 |
| Lead | ppm | ASTM D5185m | >5 | **0** | 0 | 2 |
| Copper | ppm | ASTM D5185m | >10 | **0** | <1 | <1 |
| Tin | ppm | ASTM D5185m | >10 | **0** | 0 | 0 |
| Antimony | ppm | ASTM D5185m | >5 | **---** | --- | 0 |
| Vanadium | ppm | ASTM D5185m | | **0** | 0 | 0 |
| Cadmium | ppm | ASTM D5185m | | **0** | 0 | <1 |

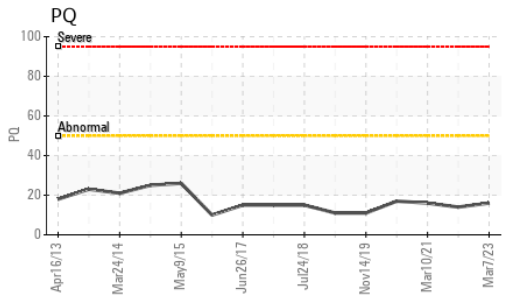
| ADDITIVES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Boron | ppm | ASTM D5185m | 25 | **<1** | 0 | 2 |
| Barium | ppm | ASTM D5185m | | **0** | 0 | 0 |
| Molybdenum | ppm | ASTM D5185m | | **0** | 0 | 0 |
| Manganese | ppm | ASTM D5185m | | **<1** | <1 | <1 |
| Magnesium | ppm | ASTM D5185m | | **<1** | <1 | 3 |
| Calcium | ppm | ASTM D5185m | 17 | **6** | 10 | 16 |
| Phosphorus | ppm | ASTM D5185m | 200 | **196** | 215 | 160 |
| Zinc | ppm | ASTM D5185m | | **12** | 8 | 10 |
| Sulfur | ppm | ASTM D5185m | 5000 | **5061** | 4070 | 3098 |

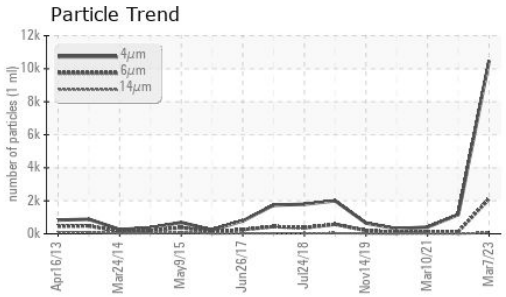
| CONTAMINANTS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Silicon | ppm | ASTM D5185m | >15 | **11** | 0 | <1 |
| Sodium | ppm | ASTM D5185m | | **5** | 4 | 5 |
| Potassium | ppm | ASTM D5185m | >20 | **<1** | 0 | 0 |
| Water | % | ASTM D6304 | >0.03 | **0.008** | 0.006 | 0.023 |
| ppm Water | ppm | ASTM D6304 | >300 | **87.7** | 69.6 | 234.9 |

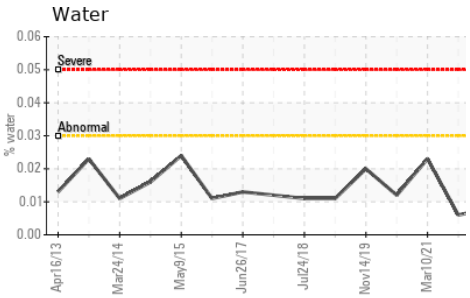
| FLUID CLEANLINESS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Particles >4µm | | ASTM D7647 | | **10476** | 1165 | 406 |
| Particles >6µm | | ASTM D7647 | >5000 | **2110** | 131 | 100 |
| Particles >14µm | | ASTM D7647 | >640 | **56** | 11 | 13 |
| Particles >21µm | | ASTM D7647 | >160 | **8** | 2 | 4 |
| Particles >38µm | | ASTM D7647 | >40 | **1** | 0 | 0 |
| Particles >71µm | | ASTM D7647 | >10 | **0** | 0 | 0 |
| Oil Cleanliness | | ISO 4406 (c) | >--/19/16 | **21/18/13** | 17/14/11 | 16/14/11 |

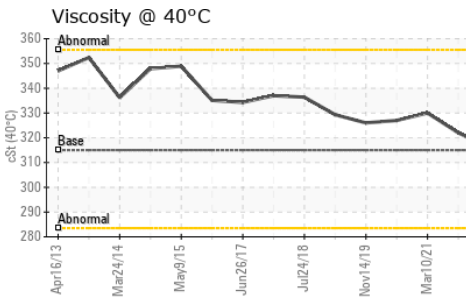
# OIL ANALYSIS REPORT



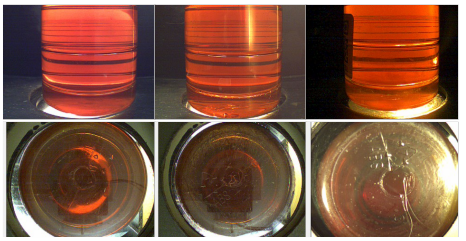




| FLUID DEGRADATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Acid Number (AN) | mg KOH/g | ASTM D8045 | 0.9 | **0.77** | 0.87 | 0.841 |

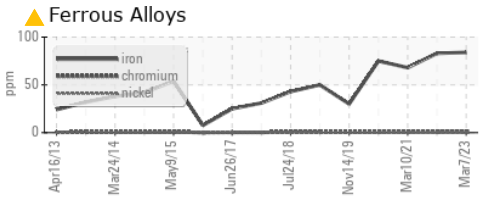
| VISUAL | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| White Metal | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Yellow Metal | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Precipitate | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Silt | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Debris | scalar | *Visual | NONE | **LIGHT** | 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 | >0.03 | **NEG** | NEG | NEG |
| Free Water | scalar | *Visual | | **NEG** | NEG | NEG |

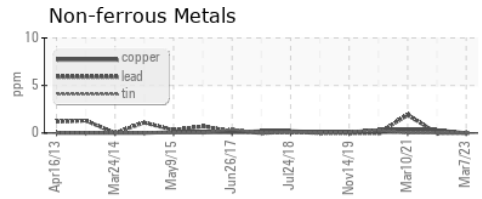
| FLUID PROPERTIES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Visc @ 40°C | cSt | ASTM D445 | 315 | **316** | 322 | 330 |

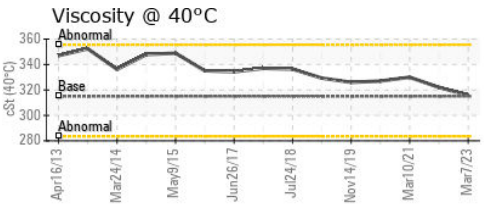
| SAMPLE IMAGES | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|
| Color | | | | | |
| Bottom | | | | | |

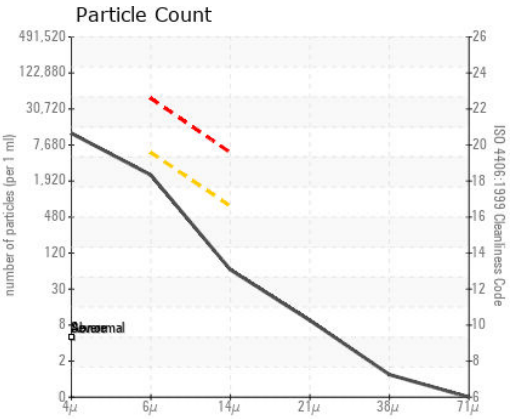


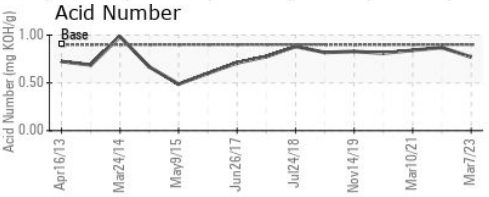
## GRAPHS




**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513
**Sample No.** : WC0804523 **Received** : 26 May 2023
**Lab Number** : 05857965 **Diagnosed** : 30 May 2023
**Unique Number** : 10492430 **Diagnostician** : Don Baldridge
**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)*

**ENERGIA EOLICA**
STA ANA KM25 CARRETERA AL SUR, A 1KM DEL CRUCE
FRANCISCO MORAZAN, ZZ
HN
Contact: SANTOS DEL CID
sdelcid@dencmi.com
T: x:
F: x: