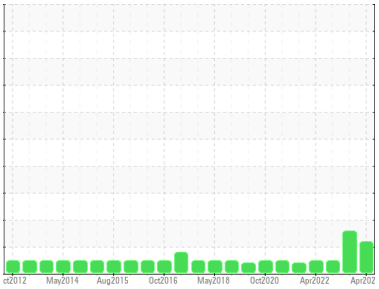
# PROBLEM SUMMARY

Area
**HIGHLAND [600380483]**
Machine Id
**05WEA80812**
Component
**Wind Turbine Gearbox**
Fluid
**MOBIL XMP 320 (--- LTR)**

Sample Rating Trend




**VISUAL METAL**

## COMPONENT CONDITION SUMMARY

No relevant graphs to display

## RECOMMENDATION

We suspect abnormal metal contamination may be due to sampling method. We recommend you service the filters on this component if applicable. Resample at the next service interval to monitor. We were unable to perform a particle count due to a high concentration of particles present in this sample.

## PROBLEMATIC TEST RESULTS

| | | | | | | |
|---|---|---|---|---|---|---|
| Sample Status | | | | **ABNORMAL** | ABNORMAL | NORMAL |
| White Metal | scalar | *Visual | NONE | ▲ **MODER** | LIGHT | LIGHT |

**Customer Id:** NORHIG
**Sample No.:** NX05928237
**Lab Number:** 05928237
**Test Package:** IND 2

*To manage this report scan the QR code*

*To discuss the diagnosis or test data:*
Doug Bogart +1 (800)237-1369 x4016
dougb@wearcheckusa.com

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

## RECOMMENDED ACTIONS

| Action | Status | Date | Done By | Description |
|---|---|---|---|---|
| Change Filter | --- | --- | ? | We recommend you service the filters on this component if applicable. |
| Alert | --- | --- | ? | We were unable to perform a particle count due to a high concentration of particles present in this sample. |

## HISTORICAL DIAGNOSIS

**06 Jan 2023 Diag: Doug Bogart**

ISO

We recommend you service the filters on this component. Resample at the next service interval to monitor.All component wear rates are normal. There is a high amount of particulates present in the oil. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

view report

**10 Oct 2022 Diag: Jonathan Hester**

NORMAL

Resample at the next service interval to monitor.All component wear rates are normal. The amount and size of particulates present in the system are acceptable. There is no indication of any contamination in the oil. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

view report

**20 Apr 2022 Diag: Don Baldridge**

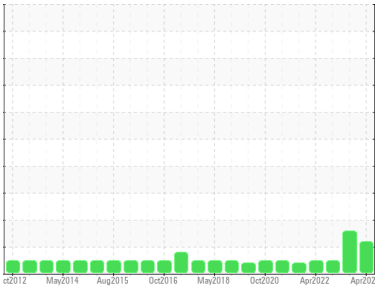
NORMAL

Resample at the next service interval to monitor.All component wear rates are normal. There is no indication of any contamination in the component. The amount and size of particulates present in the system 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




**VISUAL METAL**

Area
**HIGHLAND [600380483]**
Machine Id
**05WEA80812**
Component
**Wind Turbine Gearbox**
Fluid
**MOBIL XMP 320 (--- LTR)**

## DIAGNOSIS

**Recommendation**

We suspect abnormal metal contamination may be due to sampling method. We recommend you service the filters on this component if applicable. Resample at the next service interval to monitor. We were unable to perform a particle count due to a high concentration of particles present in this sample.

**Wear**

Moderate concentration of visible metal present. All component wear rates are normal.

**Contamination**

No other contaminants were detected 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 | | **NX05928237** | NX05766523 | NX05700277 |
| Sample Date | | Client Info | | **03 Apr 2023** | 06 Jan 2023 | 10 Oct 2022 |
| Machine Age | mths | Client Info | | **0** | 0 | 0 |
| Oil Age | mths | Client Info | | **0** | 0 | 0 |
| Oil Changed | | Client Info | | **N/A** | N/A | N/A |
| Sample Status | | | | **ABNORMAL** | ABNORMAL | NORMAL |

| WEAR METALS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| PQ | | ASTM D8184 | >80 | **12** | 16 | 8 |
| Iron | ppm | ASTM D5185m | >150 | **114** | 88 | 83 |
| Chromium | ppm | ASTM D5185m | >5 | **<1** | <1 | <1 |
| Nickel | ppm | ASTM D5185m | >10 | **0** | <1 | 0 |
| Titanium | ppm | ASTM D5185m | >10 | **0** | 0 | 0 |
| Silver | ppm | ASTM D5185m | | **0** | 0 | 0 |
| Aluminum | ppm | ASTM D5185m | >10 | **0** | <1 | <1 |
| Lead | ppm | ASTM D5185m | >20 | **0** | 0 | 0 |
| Copper | ppm | ASTM D5185m | >50 | **1** | 1 | 1 |
| Tin | ppm | ASTM D5185m | >10 | **0** | 0 | 0 |
| Vanadium | ppm | ASTM D5185m | | **0** | 0 | 0 |
| Cadmium | ppm | ASTM D5185m | | **0** | 0 | 0 |

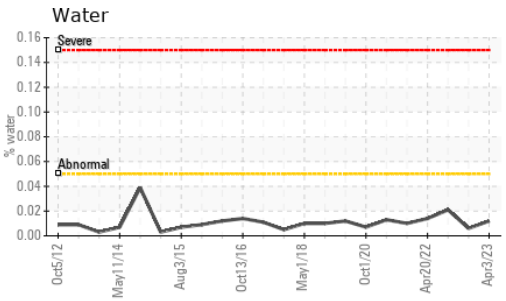
| ADDITIVES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Boron | ppm | ASTM D5185m | | **0** | 0 | 0 |
| Barium | ppm | ASTM D5185m | | **0** | 0 | 0 |
| Molybdenum | ppm | ASTM D5185m | | **1** | <1 | 5 |
| Manganese | ppm | ASTM D5185m | | **1** | 1 | 1 |
| Magnesium | ppm | ASTM D5185m | | **0** | <1 | 0 |
| Calcium | ppm | ASTM D5185m | | **<1** | 0 | 5 |
| Phosphorus | ppm | ASTM D5185m | 315 | **366** | 354 | 358 |
| Zinc | ppm | ASTM D5185m | | **12** | 14 | 12 |
| Sulfur | ppm | ASTM D5185m | | **13442** | 13187 | 14008 |

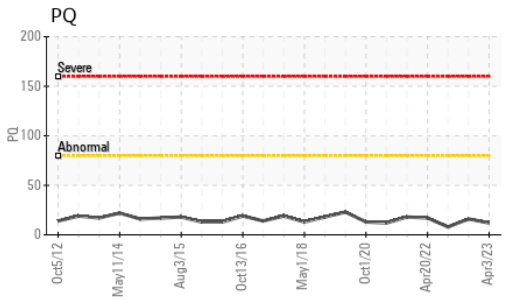
| CONTAMINANTS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Silicon | ppm | ASTM D5185m | >50 | **3** | 3 | 3 |
| Sodium | ppm | ASTM D5185m | >20 | **0** | 1 | 0 |
| Potassium | ppm | ASTM D5185m | >20 | **0** | <1 | 0 |
| Water | % | ASTM D6304 | >0.05 | **0.012** | 0.006 | 0.021 |
| ppm Water | ppm | ASTM D6304 | >500 | **124.5** | 66.6 | 211.6 |

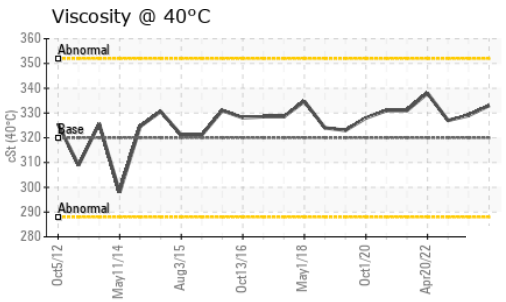
| FLUID CLEANLINESS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Particles >4µm | | ASTM D7647 | | --- | 81081 | 1474 |
| Particles >6µm | | ASTM D7647 | >2500 | --- | ▲ 23506 | 429 |
| Particles >14µm | | ASTM D7647 | >320 | --- | ▲ 605 | 39 |
| Particles >21µm | | ASTM D7647 | >80 | --- | ▲ 126 | 10 |
| Particles >38µm | | ASTM D7647 | >20 | --- | 10 | 1 |
| Particles >71µm | | ASTM D7647 | >4 | --- | 0 | 0 |
| Oil Cleanliness | | ISO 4406 (c) | >--/18/15 | --- | ▲ 24/22/16 | 18/16/12 |

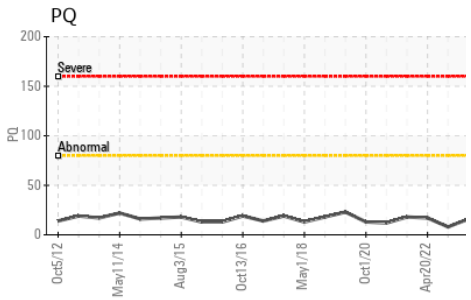
| FLUID DEGRADATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Acid Number (AN) | mg KOH/g | ASTM D8045 | | **1.22** | 1.23 | 1.21 |

# OIL ANALYSIS REPORT



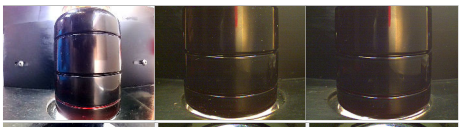
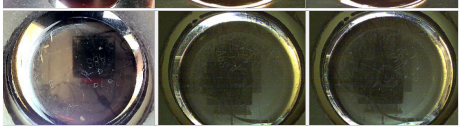



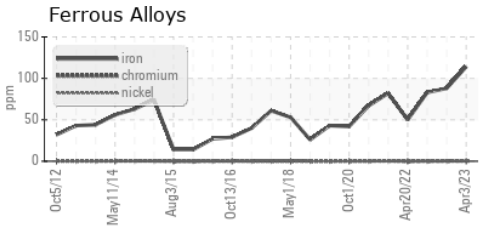



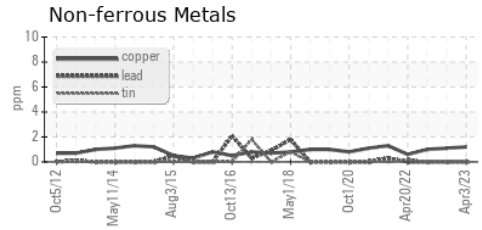

| VISUAL | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| White Metal | scalar | *Visual | NONE | ▲ **MODER** | LIGHT | LIGHT |
| Yellow Metal | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Precipitate | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Silt | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Debris | scalar | *Visual | NONE | **NONE** | NONE | VLITE |
| 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 | >0.05 | **NEG** | NEG | NEG |
| Free Water | scalar | *Visual | | **NEG** | NEG | NEG |

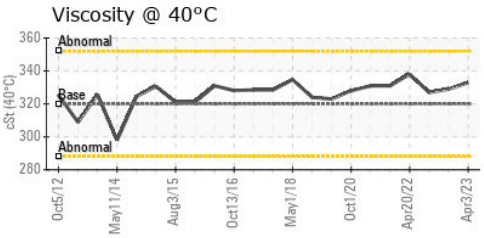
| FLUID PROPERTIES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Visc @ 40°C | cSt | ASTM D445 | 320 | **333** | 329 | 327 |

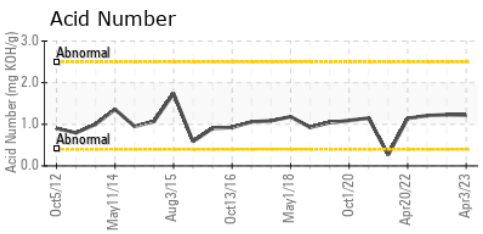
| SAMPLE IMAGES | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|
| Color | | |  | | |
| Bottom | | |  | | |

## GRAPHS




Certificate L2367

**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513
**Sample No.** : NX05928237 **Received** : 18 Aug 2023
**Lab Number** : 05928237 **Diagnosed** : 21 Aug 2023
**Unique Number** : 10608184 **Diagnostician** : Doug Bogart
**Test Package** : IND 2 ( Additional Tests: KF, PQ, 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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