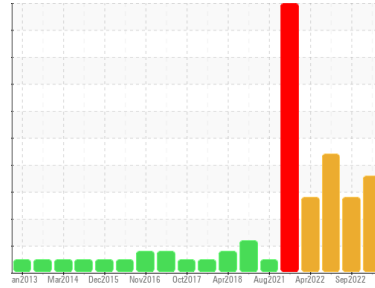




# PROBLEM SUMMARY

Sample Rating Trend



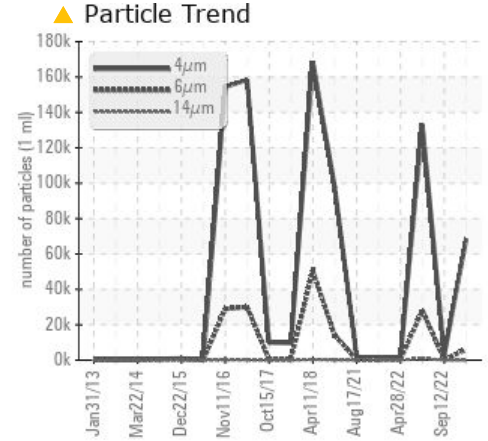
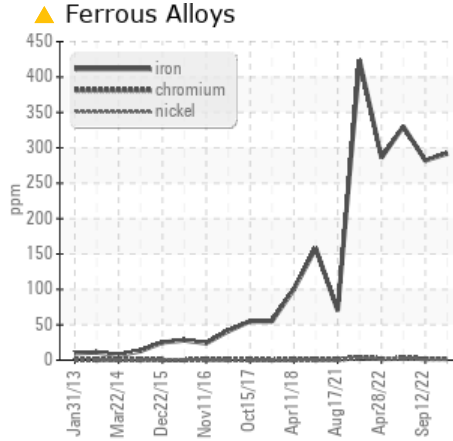
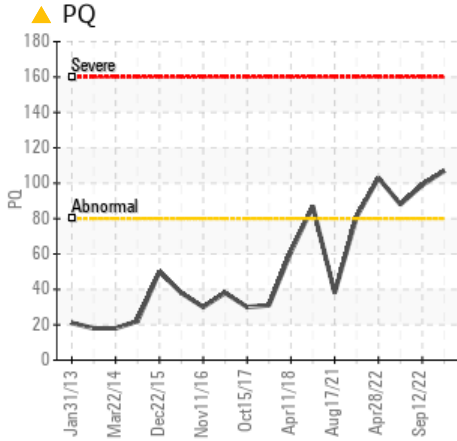
**WEAR**



Area  
**BEEBE [200005316]**  
 Machine Id  
**04WEA82343**

Component  
**Wind Turbine Gearbox**  
 Fluid  
**CASTROL OPTIGEAR SYNTHETIC X 320 (4 LTR)**

## COMPONENT CONDITION SUMMARY



## RECOMMENDATION

No corrective action is recommended at this time. We recommend an early resample to monitor this condition.

## PROBLEMATIC TEST RESULTS

Sample Status				<b>ABNORMAL</b>	ABNORMAL	ABNORMAL
PQ	ASTM D8184	>80	▲ <b>107</b>	▲ 99	▲ 88	
Iron	ppm	ASTM D5185m	> 150	▲ <b>292</b>	▲ 282	▲ 330
Particles >6µm		ASTM D7647	>2500	▲ <b>5965</b>	385	▲ 28051
Oil Cleanliness		ISO 4406 (c)	>--/18/15	▲ <b>23/20/13</b>	19/16/11	▲ 24/22/17

Customer Id: NORBEE  
 Sample No.: NX05798676  
 Lab Number: 05798676  
 Test Package: IND 2



To manage this report scan the QR code

To discuss the diagnosis or test data:  
 Jonathan Hester +1 919-379-4092 x4092  
[jhester@wearcheckusa.com](mailto:jhester@wearcheckusa.com)

To change component or sample information:  
 Customer Service +1 1-800-237-1369  
[customerservice@wearcheck.com](mailto:customerservice@wearcheck.com)

**RECOMMENDED ACTIONS**

Action	Status	Date	Done By	Description
Resample	---	---	?	We recommend an early resample to monitor this condition.

**HISTORICAL DIAGNOSIS**

**12 Sep 2022 Diag: Don Baldrige**

WEAR



No corrective action is recommended at this time. Resample at the next service interval to monitor. Gear wear is indicated. The high ferrous density (PQ) index indicates that abnormal wear is occurring. There is no indication of any contamination in the oil. The amount and size of particulates present in the system are acceptable. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

view report



**18 Aug 2022 Diag: Jonathan Hester**

WEAR



We recommend you service the filters on this component. We recommend an early resample to monitor this condition. Gear wear is indicated. The high ferrous density (PQ) index indicates that abnormal wear is occurring. 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



**28 Apr 2022 Diag: Jonathan Hester**

WEAR



No corrective action is recommended at this time. Resample at the next service interval to monitor. Gear wear is indicated. The high ferrous density (PQ) index indicates that abnormal wear is occurring. There is no indication of any contamination in the oil. The amount and size of particulates present in the system are acceptable. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

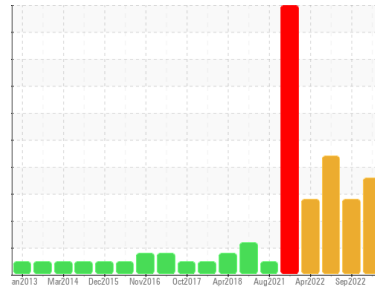
view report





# OIL ANALYSIS REPORT

Sample Rating Trend



**WEAR**



Area  
**BEEBE [200005316]**  
 Machine Id  
**04WEA82343**

Component  
**Wind Turbine Gearbox**  
 Fluid  
**CASTROL OPTIGEAR SYNTHETIC X 320 (4 LTR)**

## DIAGNOSIS

### Recommendation

No corrective action is recommended at this time. We recommend an early resample to monitor this condition.

### Wear

Gear wear is indicated. The high ferrous density (PQ) index indicates that abnormal wear is occurring.

### 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		<b>NX05798676</b>	NX05666441	NX05621781
Sample Date	Client Info		<b>12 Jan 2023</b>	12 Sep 2022	18 Aug 2022
Machine Age	hrs	Client Info	<b>72217</b>	69733	69271
Oil Age	hrs	Client Info	<b>0</b>	0	0
Oil Changed	Client Info		<b>N/A</b>	N/A	N/A
Sample Status			<b>ABNORMAL</b>	ABNORMAL	ABNORMAL

## WEAR METALS

	method	limit/base	current	history1	history2
PQ	ASTM D8184	>80	<b>▲ 107</b>	▲ 99	▲ 88
Iron	ppm	ASTM D5185m	>150	<b>▲ 292</b>	▲ 282
Chromium	ppm	ASTM D5185m	>5	<b>2</b>	2
Nickel	ppm	ASTM D5185m	>10	<b>1</b>	<1
Titanium	ppm	ASTM D5185m	>10	<b>0</b>	0
Silver	ppm	ASTM D5185m		<b>0</b>	0
Aluminum	ppm	ASTM D5185m	>10	<b>1</b>	1
Lead	ppm	ASTM D5185m	>20	<b>0</b>	0
Copper	ppm	ASTM D5185m	>50	<b>2</b>	2
Tin	ppm	ASTM D5185m	>10	<b>0</b>	<1
Vanadium	ppm	ASTM D5185m		<b>0</b>	<1
Cadmium	ppm	ASTM D5185m		<b>0</b>	0

## ADDITIVES

	method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185m		<b>0</b>	28
Barium	ppm	ASTM D5185m		<b>2</b>	2
Molybdenum	ppm	ASTM D5185m	1150	<b>801</b>	792
Manganese	ppm	ASTM D5185m		<b>2</b>	2
Magnesium	ppm	ASTM D5185m		<b>12</b>	14
Calcium	ppm	ASTM D5185m	2000	<b>1621</b>	1662
Phosphorus	ppm	ASTM D5185m	400	<b>311</b>	337
Zinc	ppm	ASTM D5185m	0	<b>5</b>	4
Sulfur	ppm	ASTM D5185m	1850	<b>1776</b>	2174

## CONTAMINANTS

	method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185m	>50	<b>12</b>	10
Sodium	ppm	ASTM D5185m	>20	<b>0</b>	6
Potassium	ppm	ASTM D5185m	>20	<b>&lt;1</b>	0
Water	%	ASTM D6304	>0.05	<b>0.013</b>	0.040
ppm Water	ppm	ASTM D6304	>500	<b>137.5</b>	401.4

## FLUID CLEANLINESS

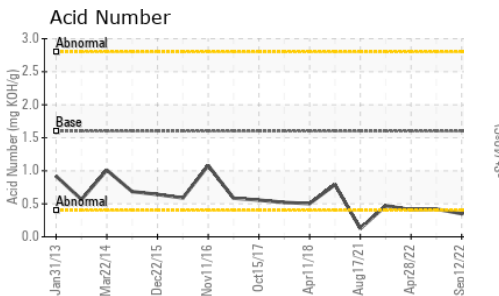
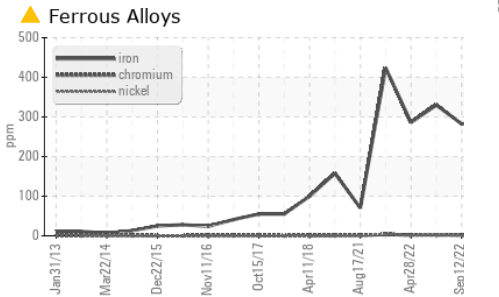
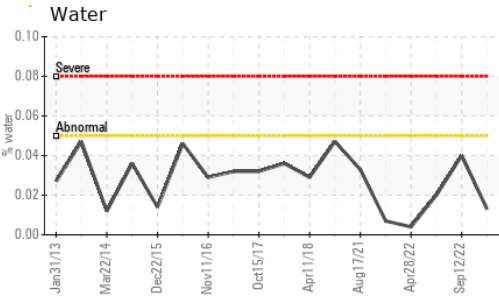
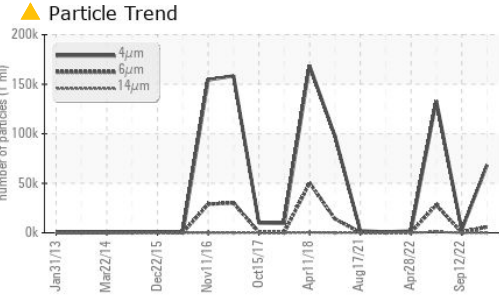
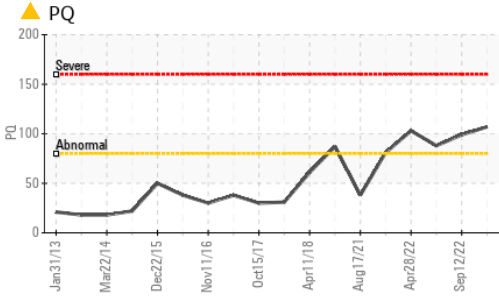
	method	limit/base	current	history1	history2
Particles >4µm	ASTM D7647		<b>68460</b>	2908	133103
Particles >6µm	ASTM D7647	>2500	<b>▲ 5965</b>	385	▲ 28051
Particles >14µm	ASTM D7647	>320	<b>51</b>	20	▲ 870
Particles >21µm	ASTM D7647	>80	<b>5</b>	6	▲ 103
Particles >38µm	ASTM D7647	>20	<b>0</b>	0	1
Particles >71µm	ASTM D7647	>4	<b>0</b>	0	0
Oil Cleanliness	ISO 4406 (c)	>--/18/15	<b>▲ 23/20/13</b>	19/16/11	▲ 24/22/17

## FLUID DEGRADATION

	method	limit/base	current	history1	history2
Acid Number (AN)	mg KOH/g	ASTM D8045	1.6	<b>0.52</b>	0.35



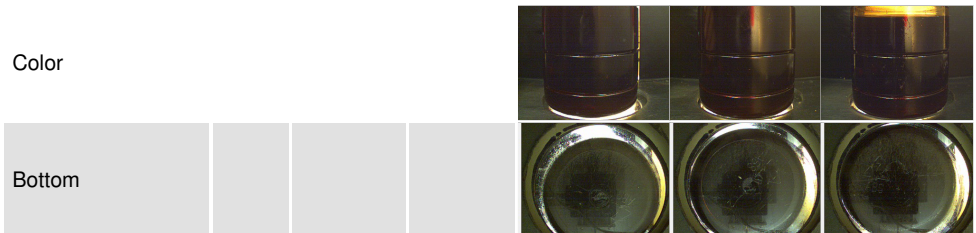
# OIL ANALYSIS REPORT



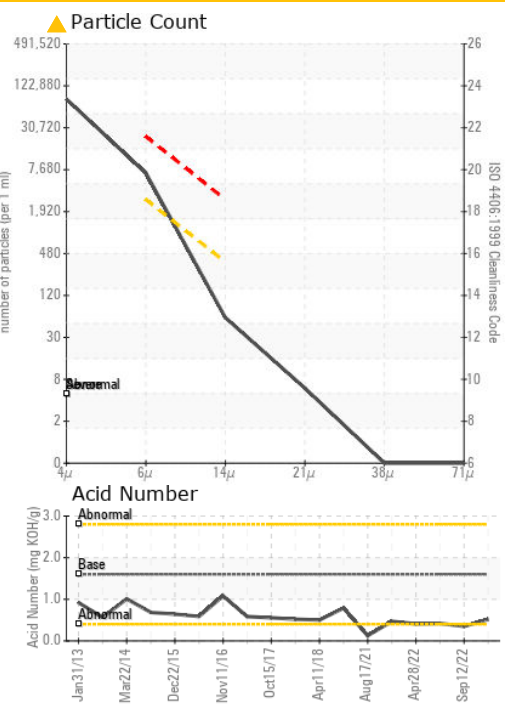
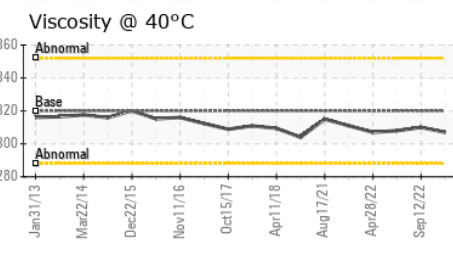
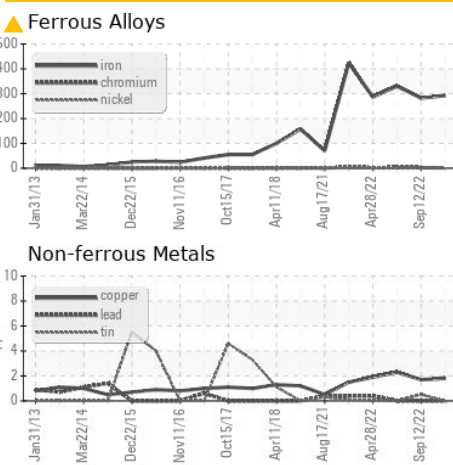
VISUAL	method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	LIGHT
Yellow Metal	scalar	*Visual	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML
Emulsified Water	scalar	*Visual	>0.05	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG

FLUID PROPERTIES	method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D445	320	307	310

SAMPLE IMAGES	method	limit/base	current	history1	history2
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## GRAPHS



**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513  
**Sample No.** : NX05798676 **Received** : 22 Mar 2023  
**Lab Number** : 05798676 **Diagnosed** : 24 Mar 2023  
**Unique Number** : 10388360 **Diagnostician** : Jonathan Hester  
**Test Package** : IND 2 ( Additional Tests: KF, PQ, PrtCount )

**NORDEX USA - BEEBE**  
 1200 S COUNTY FARM RD  
 ITHACA, MI  
 US 48847  
 Contact: TUCKER WITT  
 tucker.witt@constellation.com  
 T:  
 F: (312)386-7102

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)