



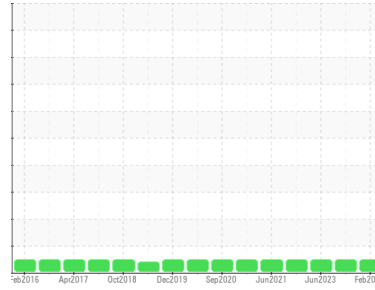
OIL ANALYSIS REPORT

Sample Rating Trend

NORMAL



Area
THUNDER SPIRIT [200005313]
 Machine Id
37WEA84033 (S/N 72802187543)
 Component
Wind Turbine Gearbox
 Fluid
CASTROL OPTIGEAR SYNTHETIC X 320 (--- QTS)



DIAGNOSIS

Recommendation

Resample at the next service interval to monitor.

Wear

All component wear rates are normal.

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		NX015523	NX013645	NX013584
Sample Date	Client Info		28 Feb 2024	29 Sep 2023	19 Jun 2023
Machine Age	hrs	Client Info	70674	47776	500
Oil Age	hrs	Client Info	0	0	0
Oil Changed	Client Info		N/A	N/A	N/A
Sample Status			NORMAL	NORMAL	NORMAL

WEAR METALS

	method	limit/base	current	history1	history2	
PQ	ASTM D8184	>80	15	11	12	
Iron	ppm	ASTM D5185m	>150	9	8	5
Chromium	ppm	ASTM D5185m	>5	0	<1	0
Nickel	ppm	ASTM D5185m	>10	0	<1	0
Titanium	ppm	ASTM D5185m	>10	0	<1	0
Silver	ppm	ASTM D5185m		0	0	0
Aluminum	ppm	ASTM D5185m	>10	<1	1	0
Lead	ppm	ASTM D5185m	>20	0	0	0
Copper	ppm	ASTM D5185m	>50	0	<1	<1
Tin	ppm	ASTM D5185m	>10	0	<1	0
Vanadium	ppm	ASTM D5185m		0	0	0
Cadmium	ppm	ASTM D5185m		0	<1	0

ADDITIVES

	method	limit/base	current	history1	history2	
Boron	ppm	ASTM D5185m		7	6	10
Barium	ppm	ASTM D5185m		0	<1	2
Molybdenum	ppm	ASTM D5185m	1150	66	70	80
Manganese	ppm	ASTM D5185m		<1	0	0
Magnesium	ppm	ASTM D5185m		0	0	<1
Calcium	ppm	ASTM D5185m	2000	137	134	154
Phosphorus	ppm	ASTM D5185m	400	200	215	208
Zinc	ppm	ASTM D5185m	0	0	0	4
Sulfur	ppm	ASTM D5185m	1850	4326	4254	4442

CONTAMINANTS

	method	limit/base	current	history1	history2	
Silicon	ppm	ASTM D5185m	>50	<1	<1	1
Sodium	ppm	ASTM D5185m	>20	0	0	0
Potassium	ppm	ASTM D5185m	>20	0	4	2
Water	%	ASTM D6304	>0.05	0.001	0.011	0.006
ppm Water	ppm	ASTM D6304	>500	5	111.2	68.6

FLUID CLEANLINESS

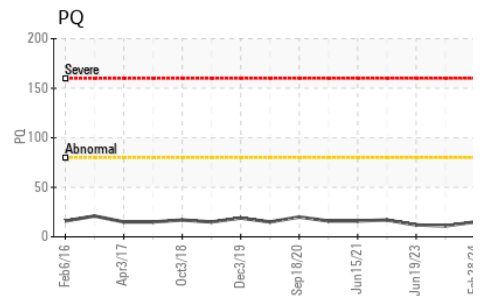
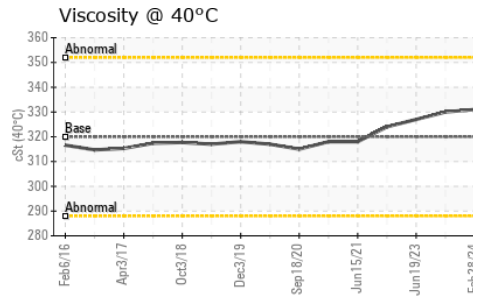
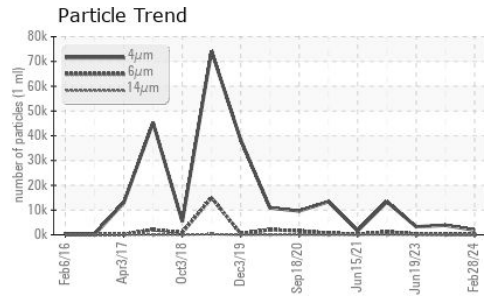
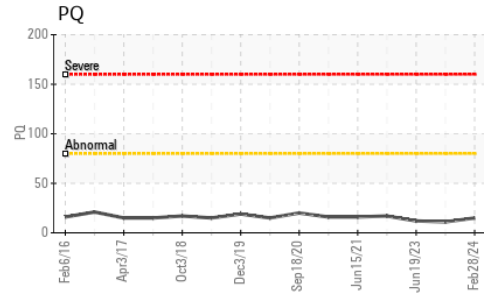
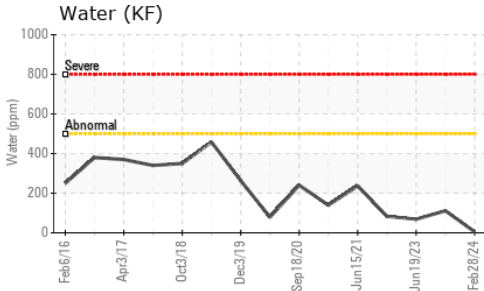
	method	limit/base	current	history1	history2
Particles >4µm	ASTM D7647		1910	3838	3252
Particles >6µm	ASTM D7647	>2500	122	163	305
Particles >14µm	ASTM D7647	>320	5	15	21
Particles >21µm	ASTM D7647	>80	1	7	7
Particles >38µm	ASTM D7647	>20	0	1	1
Particles >71µm	ASTM D7647	>4	0	0	1
Oil Cleanliness	ISO 4406 (c)	>--/18/15	18/14/10	19/15/11	19/15/12

FLUID DEGRADATION

	method	limit/base	current	history1	history2	
Acid Number (AN)	mg KOH/g	ASTM D8045	1.6	0.32	0.33	0.39



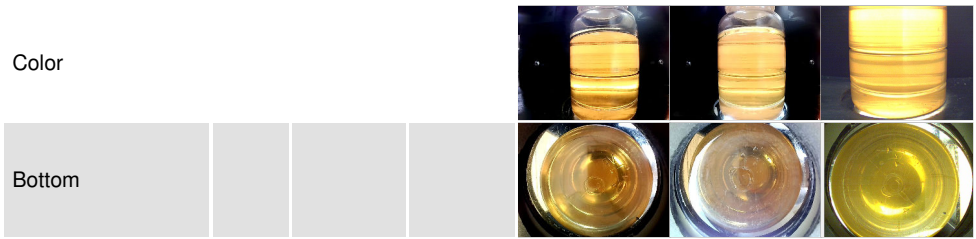
OIL ANALYSIS REPORT



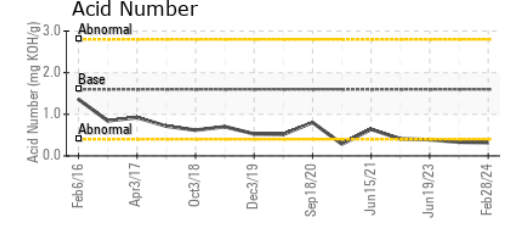
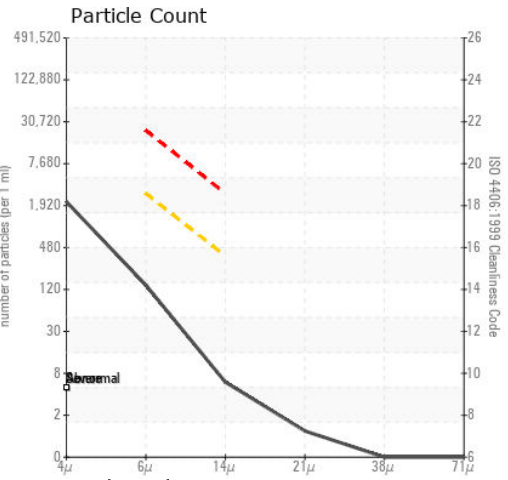
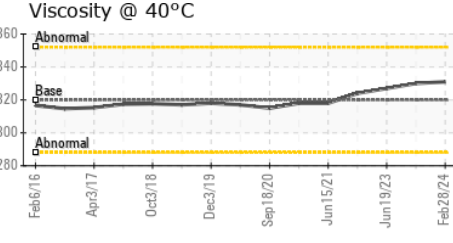
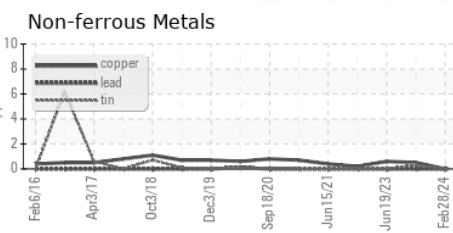
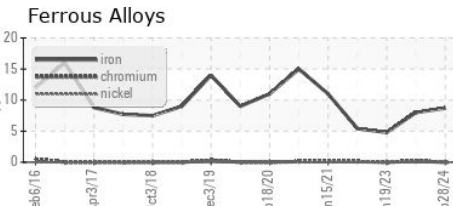
VISUAL	method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE
Appearance	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	331	330

SAMPLE IMAGES	method	limit/base	current	history1	history2
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GRAPHS



Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : NX015523
Lab Number : 06123092
Unique Number : 10937243
Test Package : IND 2 (Additional Tests: KF, PQ, PrtCount)

NORDEX USA - Chicago
 300 SOUTH WACKER DRIVE, SUITE 1500
 CHICAGO, IL
 US 60606

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)