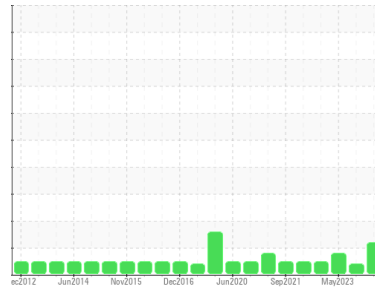




OIL ANALYSIS REPORT

Sample Rating Trend



ADDITIVES



Area

ROTH ROCK [200005321]

Machine Id

01WEA81559

Component

Wind Turbine Gearbox

Fluid

CASTROL OPTIGEAR SYNTHETIC A ISO 320 (--- LTR)

DIAGNOSIS

Recommendation

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

Wear

All component wear rates are normal.

Contamination

There is a high amount of silt (particulates < 14 microns in size) present in the oil.

Fluid Condition

An additive depletion is indicated. The AN level is acceptable for this fluid.

SAMPLE INFORMATION

	method	limit/base	current	history1	history2
Sample Number	Client Info		NX013860	NX013885	NX012182
Sample Date	Client Info		03 May 2024	30 Nov 2023	05 May 2023
Machine Age	hrs	Client Info	0	0	0
Oil Age	hrs	Client Info	0	0	0
Oil Changed	Client Info		N/A	N/A	N/A
Sample Status			ABNORMAL	ATTENTION	ABNORMAL

WEAR METALS

	method	limit/base	current	history1	history2
PQ	ASTM D8184	>80	20	24	16
Iron	ppm	ASTM D5185m	>150	48	50
Chromium	ppm	ASTM D5185m	>5	<1	<1
Nickel	ppm	ASTM D5185m	>10	0	0
Titanium	ppm	ASTM D5185m	>10	<1	<1
Silver	ppm	ASTM D5185m		<1	0
Aluminum	ppm	ASTM D5185m	>10	3	7
Lead	ppm	ASTM D5185m	>20	<1	0
Copper	ppm	ASTM D5185m	>50	<1	2
Tin	ppm	ASTM D5185m	>10	<1	0
Vanadium	ppm	ASTM D5185m		0	<1
Cadmium	ppm	ASTM D5185m		<1	0

ADDITIVES

	method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185m	0	0	10
Barium	ppm	ASTM D5185m	0	0	0
Molybdenum	ppm	ASTM D5185m	1150	486	530
Manganese	ppm	ASTM D5185m		2	2
Magnesium	ppm	ASTM D5185m	1800	1723	1649
Calcium	ppm	ASTM D5185m	20	12	14
Phosphorus	ppm	ASTM D5185m	1450	1163	1173
Zinc	ppm	ASTM D5185m	1650	1268	1351
Sulfur	ppm	ASTM D5185m	4900	6013	4983

CONTAMINANTS

	method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185m	>50	8	9
Sodium	ppm	ASTM D5185m	>20	20	26
Potassium	ppm	ASTM D5185m	>20	<1	0
Water	%	ASTM D6304	>0.1	0.018	0.026
ppm Water	ppm	ASTM D6304	>1000	188	261

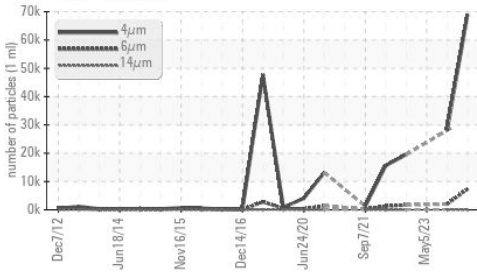
FLUID CLEANLINESS

	method	limit/base	current	history1	history2
Particles >4µm	ASTM D7647		68961	28084	---
Particles >6µm	ASTM D7647	>2500	7348	2040	---
Particles >14µm	ASTM D7647	>320	45	40	---
Particles >21µm	ASTM D7647	>80	6	9	---
Particles >38µm	ASTM D7647	>20	0	1	---
Particles >71µm	ASTM D7647	>4	0	0	---
Oil Cleanliness	ISO 4406 (c)	>--/18/15	23/20/13	22/18/12	---

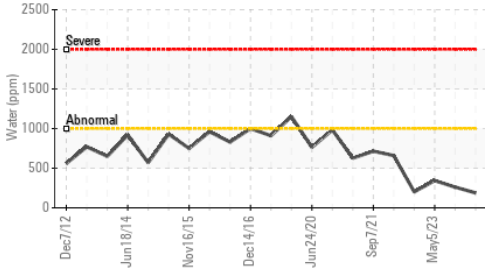
FLUID DEGRADATION

	method	limit/base	current	history1	history2
Acid Number (AN)	mg KOH/g	ASTM D8045	3.3	1.64	2.69

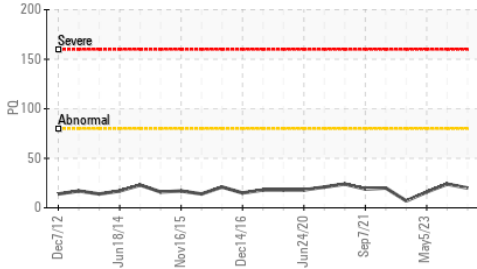
Particle Trend



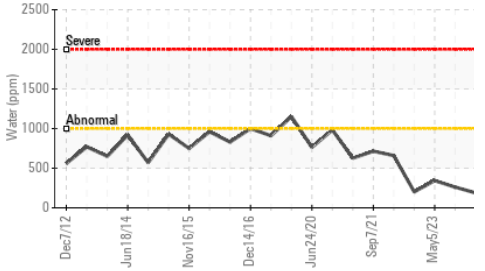
Water (KF)



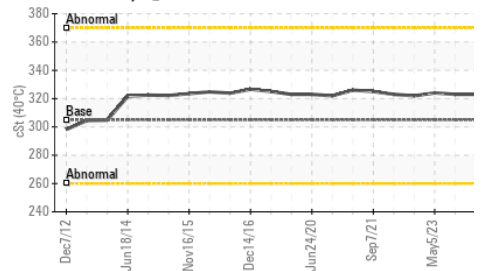
PQ



Water (KF)



Viscosity @ 40°C



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	▲ MODER
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	>0.1	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG

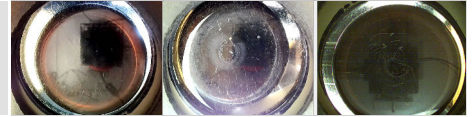
FLUID PROPERTIES	method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D445	305	323	324

SAMPLE IMAGES	method	limit/base	current	history1	history2
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Color

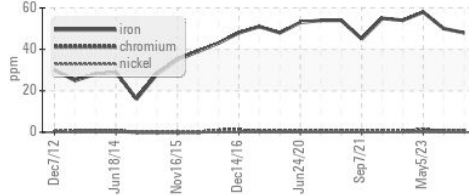


Bottom

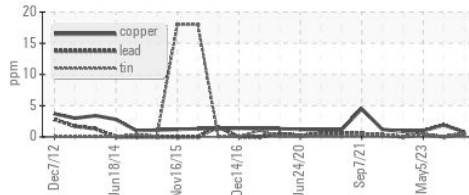


GRAPHS

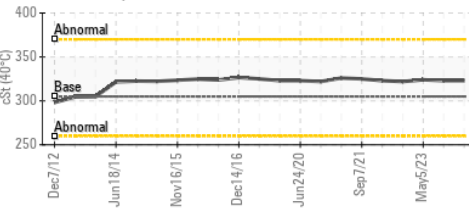
Ferrous Alloys



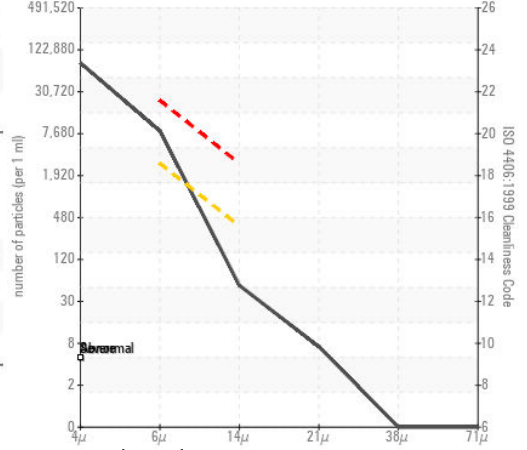
Non-ferrous Metals



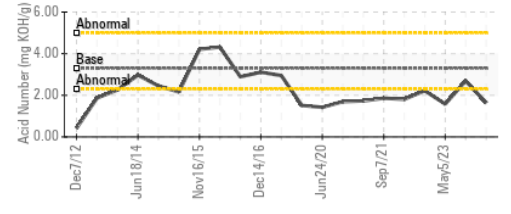
Viscosity @ 40°C



Particle Count



Acid Number



Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513

Sample No. : NX013860

Lab Number : 06182834

Unique Number : 11034160

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)

Received : 17 May 2024

Tested : 22 May 2024

Diagnosed : 22 May 2024 - Don Baldrige

NORDEX USA - ROTH ROCK

300 SOUTH WACKER DRIVE, SUITE 1500

CHICAGO, IL

US 60606

Contact: ADAY MAGEC

aday.magec@gestampren.com

T:

F: (312)386-7102