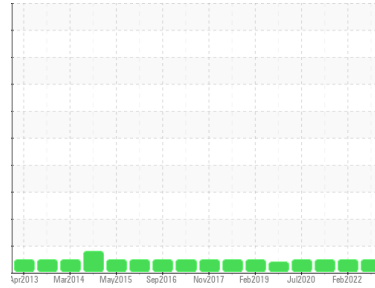




OIL ANALYSIS REPORT

Sample Rating Trend

NORMAL



Area

9

Machine Id

WINERGY GEARBOX WTG-905 (S/N 4836486-0020-2)

Component

Wind Turbine Gearbox

Fluid

FUCHS RENOLIN UNISYN CKC ISO 320 (340 LTR)

DIAGNOSIS

Recommendation

Resample at the next service interval to monitor. Analytical Ferrography: Results are normal, with typical amounts of ferrous rubbing wear and contamination present.

Wear

All component wear rates are normal.

Contaminants

The amount and size of particulates present in the system are acceptable. There is no indication of any contamination in the oil.

Oil 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		WC0804444	WC05504517	WC0547229
Sample Date	Client Info		07 Mar 2023	03 Feb 2022	10 Mar 2021
Machine Age	mths	Client Info	83	67	120
Oil Age	mths	Client Info	83	0	65
Oil Changed	Client Info		Not Chngd	N/A	Not Chngd
Sample Status			NORMAL	NORMAL	NORMAL

WEAR METALS

	method	limit/base	current	history1	history2
PQ	ASTM D8184	>50	14	17	22
Iron	ppm	ASTM D5185m	>65	80	67
Chromium	ppm	ASTM D5185m	>3	1	1
Nickel	ppm	ASTM D5185m	>3	0	0
Titanium	ppm	ASTM D5185m	>10	0	0
Silver	ppm	ASTM D5185m		0	<1
Aluminum	ppm	ASTM D5185m	>10	<1	0
Lead	ppm	ASTM D5185m	>5	0	0
Copper	ppm	ASTM D5185m	>10	0	<1
Tin	ppm	ASTM D5185m	>10	<1	<1
Antimony	ppm	ASTM D5185m	>5	---	---
Vanadium	ppm	ASTM D5185m		0	0
Cadmium	ppm	ASTM D5185m		0	0

ADDITIVES

	method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185m	25	0	0
Barium	ppm	ASTM D5185m		0	0
Molybdenum	ppm	ASTM D5185m		0	0
Manganese	ppm	ASTM D5185m		<1	<1
Magnesium	ppm	ASTM D5185m		<1	0
Calcium	ppm	ASTM D5185m	17	7	8
Phosphorus	ppm	ASTM D5185m	200	202	216
Zinc	ppm	ASTM D5185m		16	9
Sulfur	ppm	ASTM D5185m	5000	6169	4587

CONTAMINANTS

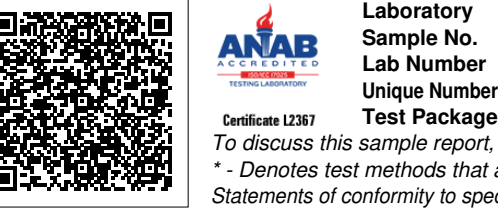
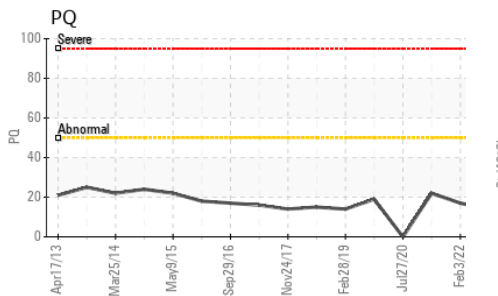
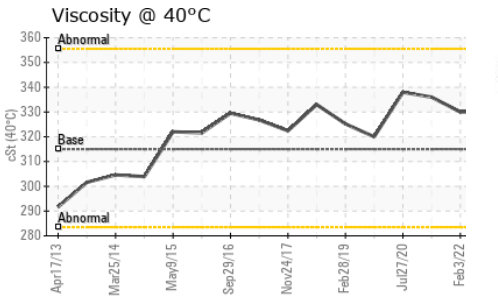
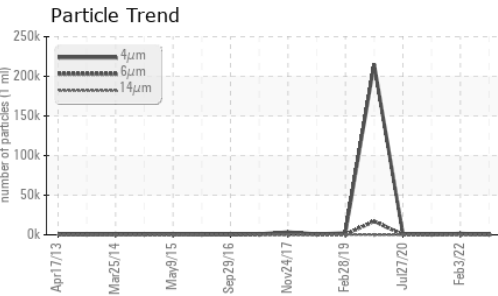
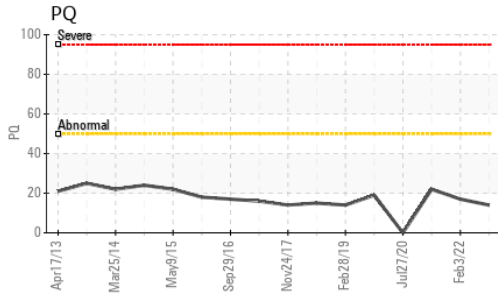
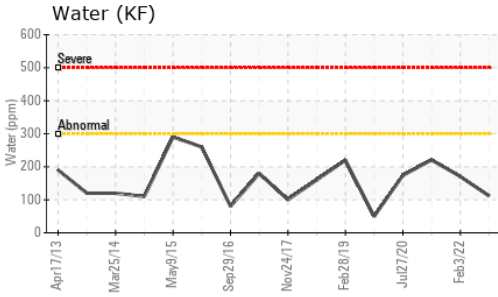
	method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185m	>15	<1	0
Sodium	ppm	ASTM D5185m		6	4
Potassium	ppm	ASTM D5185m	>20	1	0
Water	%	ASTM D6304	>0.03	0.011	0.017
ppm Water	ppm	ASTM D6304	>300	111.6	170.6

FLUID CLEANLINESS

	method	limit/base	current	history1	history2
Particles >4µm	ASTM D7647		459	1724	325
Particles >6µm	ASTM D7647	>5000	97	211	90
Particles >14µm	ASTM D7647	>640	8	13	14
Particles >21µm	ASTM D7647	>160	2	2	5
Particles >38µm	ASTM D7647	>40	0	0	0
Particles >71µm	ASTM D7647	>10	0	0	0
Oil Cleanliness	ISO 4406 (c)	>--/19/16	16/14/10	18/15/11	16/14/11



OIL ANALYSIS REPORT

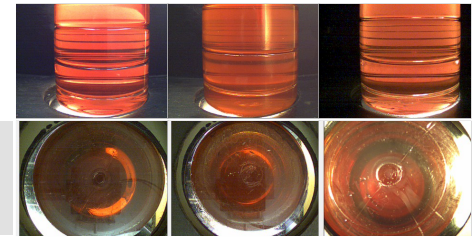


FLUID DEGRADATION		method	limit/base	current	history1	history2
Acid Number (AN)	mg KOH/g	ASTM D8045	0.9	0.92	0.95	0.974

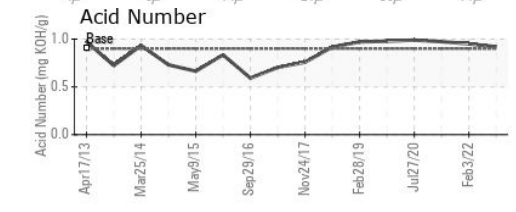
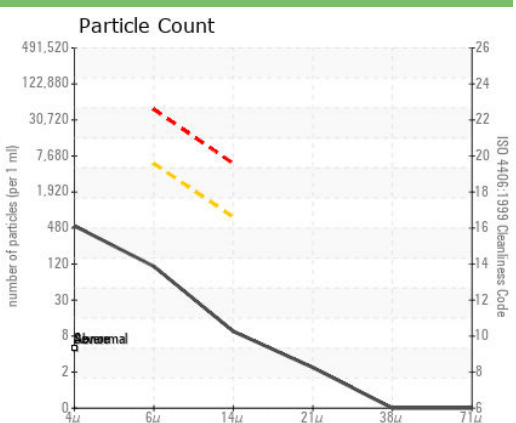
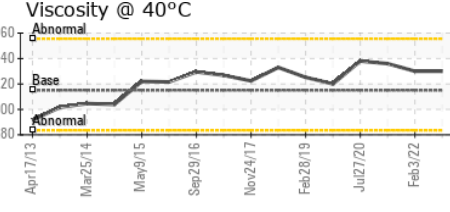
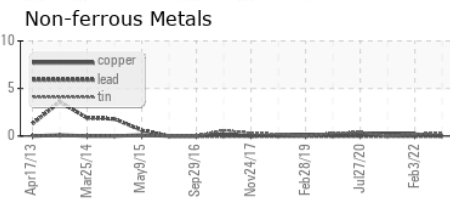
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	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	330	330	336

SAMPLE IMAGES		method	limit/base	current	history1	history2
Color						
Bottom						



GRAPHS



Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : WC0804444 **Received** : 26 May 2023
Lab Number : 05857858 **Diagnosed** : 08 Jun 2023
Unique Number : 10492323 **Diagnostician** : Aaron Black
Test Package : IND 3 (Additional Tests: KF, PrtCount)

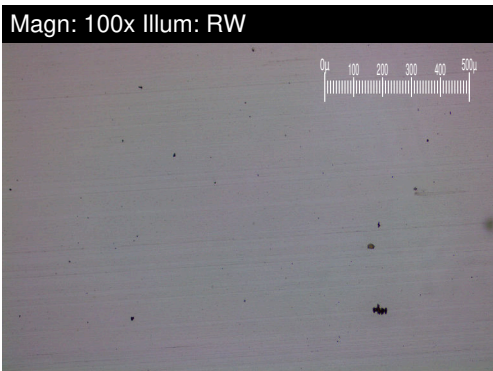
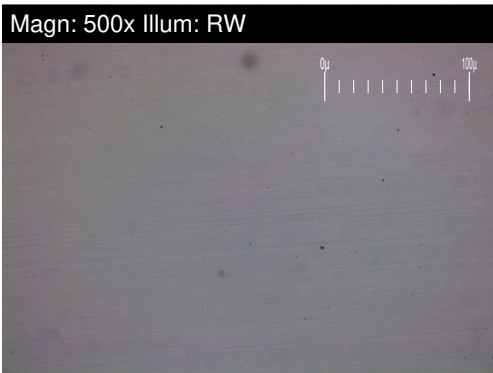
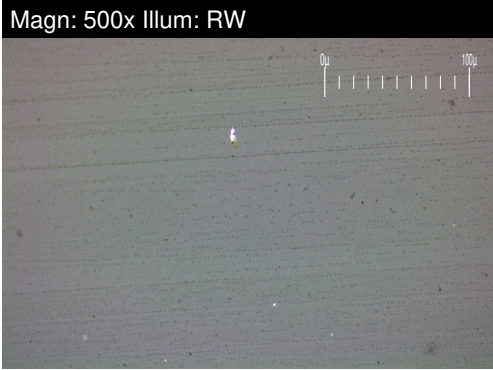
ENERGIA EOLICA
 STA ANA KM25 CARRETERA AL SUR, A 1KM DEL CRUCE
 FRANCISCO MORAZAN, ZZ
 HN
 Contact: SANTOS DEL CID
 sdelcid@dennci.com

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)

T: x:
 F: x:

FERROGRAPHY REPORT

Area
9
 Machine Id
WINERGY GEARBOX WTG-905 (S/N 4836486-0020-2)
 Component
Wind Turbine Gearbox
 Fluid
FUCHS RENOLIN UNISYN CKC ISO 320 (340 LTR)

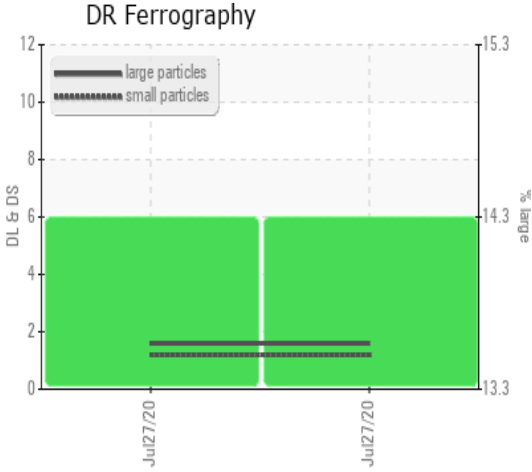


DR-FERROGRAPHY		method	limit/base	current	history1	history2
Large Particles		*DR-Ferr	>30	---	---	---
Small Particles		*DR-Ferr	>30	---	---	---
Total Particles		*DR-Ferr	>45.0	---	---	---
Large Particles Percentage	%	*DR-Ferr		---	---	---
Severity Index		*DR-Ferr		---	---	---

FERROGRAPHY		method	limit/base	current	history1	history2
Ferrous Rubbing	Scale 0-10	*ASTM D7684		█ 1		
Ferrous Sliding	Scale 0-10	*ASTM D7684				
Ferrous Cutting	Scale 0-10	*ASTM D7684				
Ferrous Rolling	Scale 0-10	*ASTM D7684				
Ferrous Break-in	Scale 0-10	*ASTM D7684				
Ferrous Spheres	Scale 0-10	*ASTM D7684				
Ferrous Black Oxides	Scale 0-10	*ASTM D7684				
Ferrous Red Oxides	Scale 0-10	*ASTM D7684				
Ferrous Corrosive	Scale 0-10	*ASTM D7684				
Ferrous Other	Scale 0-10	*ASTM D7684				
Nonferrous Rubbing	Scale 0-10	*ASTM D7684				
Nonferrous Sliding	Scale 0-10	*ASTM D7684				
Nonferrous Cutting	Scale 0-10	*ASTM D7684				
Nonferrous Rolling	Scale 0-10	*ASTM D7684				
Nonferrous Other	Scale 0-10	*ASTM D7684				
Carbonaceous Material	Scale 0-10	*ASTM D7684				
Lubricant Degradation	Scale 0-10	*ASTM D7684				
Sand/Dirt	Scale 0-10	ASTM D7684				
Fibres	Scale 0-10	*ASTM D7684				
Spheres	Scale 0-10	*ASTM D7684				
Other	Scale 0-10	*ASTM D7684		█ 1		

WEAR

All component wear rates are normal.



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