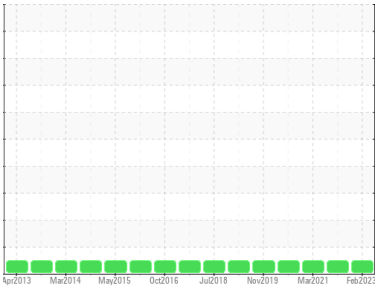
OIL ANALYSIS REPORT

Sample Rating Trend



NORMAL

Area
9
Machine Id
WINERGY GEARBOX WTG-908 (S/N 4836487-0020-5)
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. The only other notable debris was a few red oxide (rust) particles, possibly from some mild headspace oxidation or something similar, but not associated with any active problem.

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		**WC0804448**	WC05504486	WC0547226
Sample Date		Client Info		**28 Feb 2023**	03 Feb 2022	11 Mar 2021
Machine Age	mths	Client Info		**76**	61	120
Oil Age	mths	Client Info		**76**	0	65
Oil Changed		Client Info		**Not Changd**	N/A	Not Changd
Sample Status				**NORMAL**	NORMAL	NORMAL

WEAR METALS		method	limit/base	current	history1	history2
PQ		ASTM D8184	>50	**13**	18	20
Iron	ppm	ASTM D5185m	>65	**22**	21	15
Chromium	ppm	ASTM D5185m	>3	**<1**	<1	<1
Nickel	ppm	ASTM D5185m	>3	**0**	0	<1
Titanium	ppm	ASTM D5185m	>10	**0**	0	0
Silver	ppm	ASTM D5185m		**0**	<1	0
Aluminum	ppm	ASTM D5185m	>10	**<1**	0	0
Lead	ppm	ASTM D5185m	>5	**0**	<1	0
Copper	ppm	ASTM D5185m	>10	**0**	<1	<1
Tin	ppm	ASTM D5185m	>10	**<1**	0	0
Antimony	ppm	ASTM D5185m	>5	**---**	---	0
Vanadium	ppm	ASTM D5185m		**0**	0	0
Cadmium	ppm	ASTM D5185m		**0**	0	<1

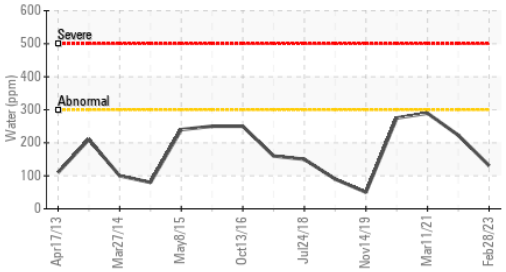
ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185m	25	**2**	0	3
Barium	ppm	ASTM D5185m		**0**	0	0
Molybdenum	ppm	ASTM D5185m		**0**	0	0
Manganese	ppm	ASTM D5185m		**<1**	<1	<1
Magnesium	ppm	ASTM D5185m		**<1**	0	0
Calcium	ppm	ASTM D5185m	17	**12**	11	10
Phosphorus	ppm	ASTM D5185m	200	**200**	205	143
Zinc	ppm	ASTM D5185m		**64**	29	30
Sulfur	ppm	ASTM D5185m	5000	**5170**	3872	2825

CONTAMINANTS		method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185m	>15	**0**	0	0
Sodium	ppm	ASTM D5185m		**3**	1	3
Potassium	ppm	ASTM D5185m	>20	**1**	0	0
Water	%	ASTM D6304	>0.03	**0.013**	0.022	0.028
ppm Water	ppm	ASTM D6304	>300	**130.9**	222.9	289.5

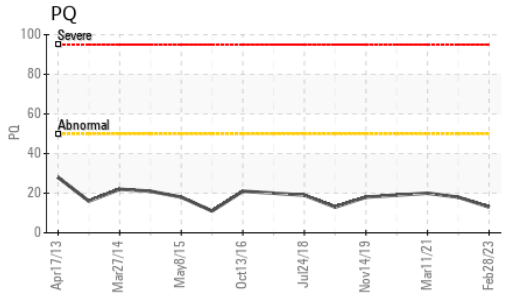
FLUID CLEANLINESS		method	limit/base	current	history1	history2
Particles >4µm		ASTM D7647		**645**	7567	4596
Particles >6µm		ASTM D7647	>5000	**217**	725	95
Particles >14µm		ASTM D7647	>640	**17**	76	9
Particles >21µm		ASTM D7647	>160	**3**	14	3
Particles >38µm		ASTM D7647	>40	**0**	2	0
Particles >71µm		ASTM D7647	>10	**0**	0	0
Oil Cleanliness		ISO 4406 (c)	>--/19/16	**17/15/11**	20/17/13	19/14/10

OIL ANALYSIS REPORT

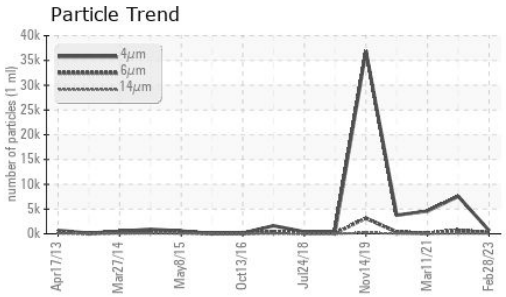
Water (KF)



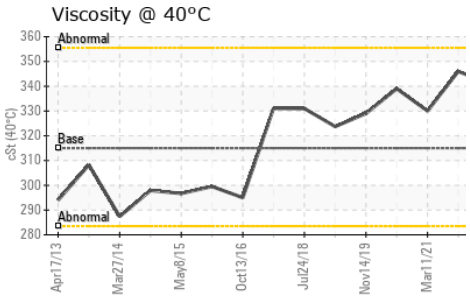
PQ



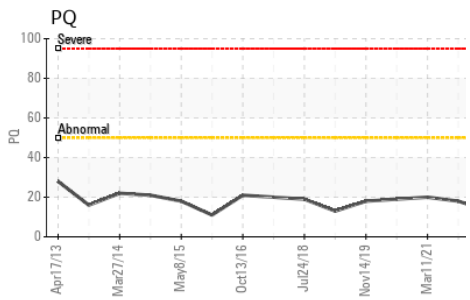
Particle Trend



Viscosity @ 40°C



PQ

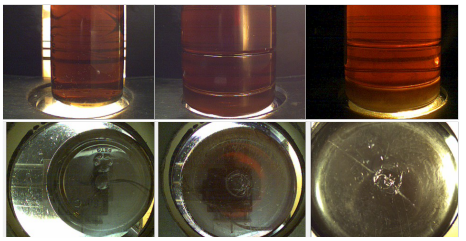


FLUID DEGRADATION		method	limit/base	current	history1	history2
Acid Number (AN)	mg KOH/g	ASTM D8045	0.9	**1.00**	1.09	1.045

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

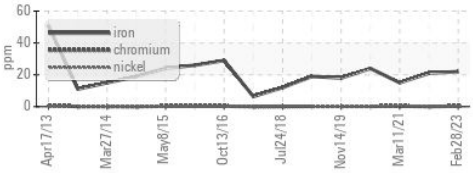
FLUID PROPERTIES		method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D445	315	**341**	346	330

SAMPLE IMAGES	method	limit/base	current	history1	history2
Color					
Bottom					

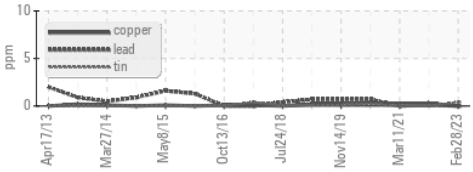


GRAPHS

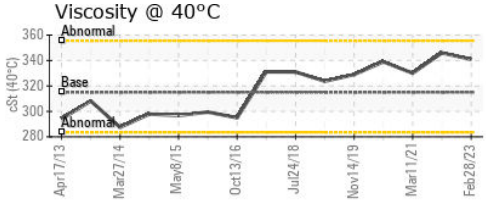
Ferrous Alloys



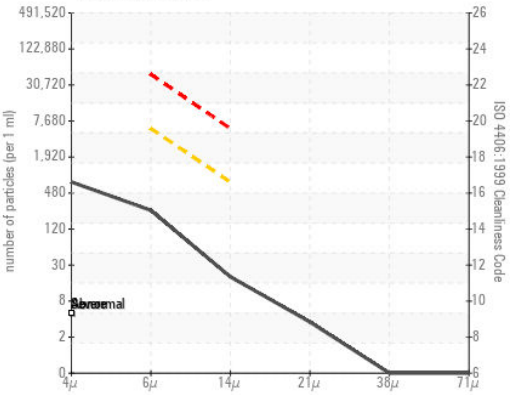
Non-ferrous Metals



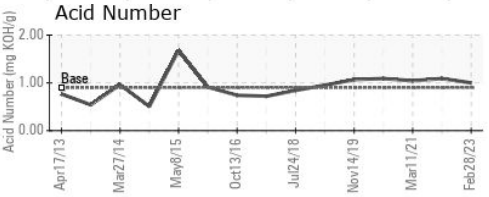
Viscosity @ 40°C



Particle Count



Acid Number



Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : WC0804448 **Received** : 26 May 2023
Lab Number : 05857855 **Diagnosed** : 08 Jun 2023
Unique Number : 10492320 **Diagnostician** : Aaron Black
Test Package : IND 3 (Additional Tests: KF, 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)

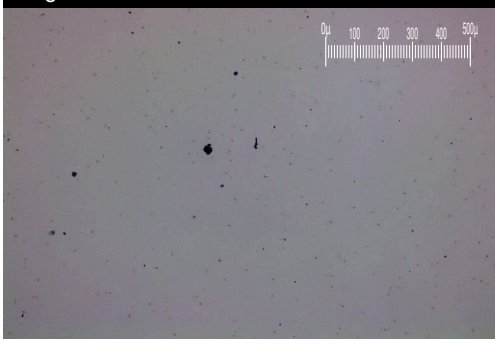
ENERGIA EOLICA
STA ANA KM25 CARRETERA AL SUR, A 1KM DEL CRUCE
FRANCISCO MORAZAN, ZZ
HN
Contact: SANTOS DEL CID
sdelcid@dencmi.com
T: x:
F: x:

FERROGRAPHY REPORT

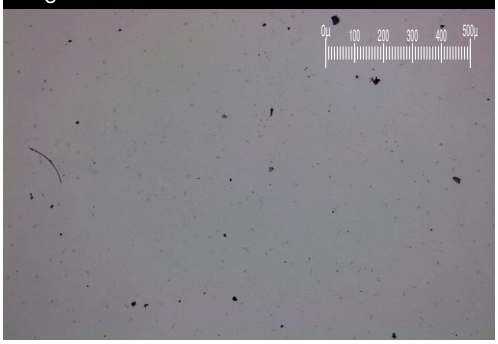
Area
9
Machine Id
WINERGY GEARBOX WTG-908 (S/N 4836487-0020-5)
Component
Wind Turbine Gearbox
Fluid
FUCHS RENOLIN UNISYN CKC ISO 320 (340 LTR)

Magn: 500x Illum: RW

Magn: 100x Illum: RW



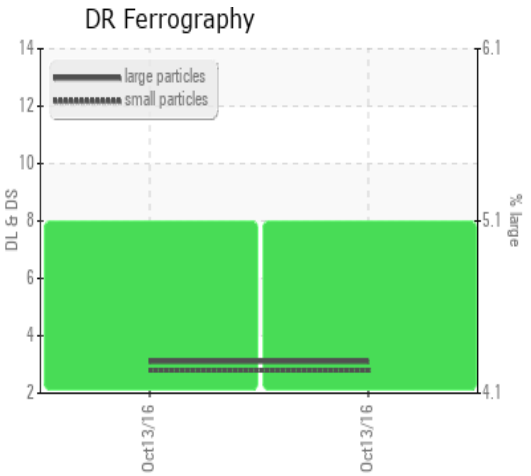
Magn: 100x Illum: RW



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		1		
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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