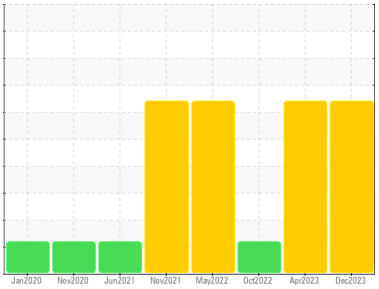
PROBLEM SUMMARY

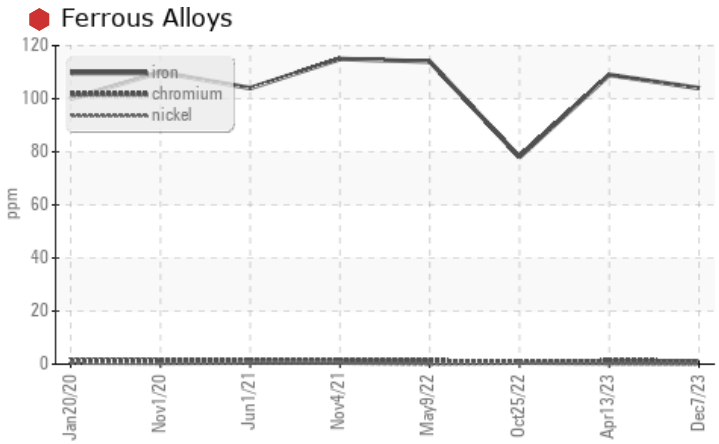
Sample Rating Trend

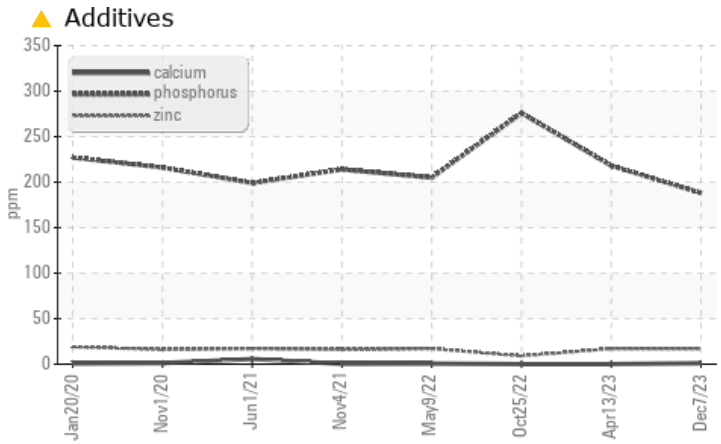


WEAR

Area
Ferndale Phase II SP-13598
Machine Id
T1 V80
Component
Wind Turbine Gearbox
Fluid
MOBIL MOBILGEAR SHC XMP 320 (--- GAL)

COMPONENT CONDITION SUMMARY





RECOMMENDATION

We recommend that you drain the oil from the component if this has not already been done. Confirm the source of the lubricant being utilized for top-up/fill. We recommend an early resample to monitor this condition. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample.

PROBLEMATIC TEST RESULTS

Sample Status				**SEVERE**	SEVERE	ABNORMAL
Iron	ppm	ASTM D5185(m)	>75	**104**	109	78
Phosphorus	ppm	ASTM D5185(m)	485	**188**	218	276

Customer Id: VESTAS
Sample No.: WC0863468
Lab Number: 02608640
Test Package: IND 2

To manage this report scan the QR code

To discuss the diagnosis or test data:
Kevin Marson +1 (289)291-4644 x4644
Kevin.Marson@wearcheck.com

To change component or sample information:
Gloria Gonzalez +1 (289)291-4643 x4643
gloria.gonzalez@wearcheck.com

RECOMMENDED ACTIONS

Action	Status	Date	Done By	Description
Change Fluid	---	---	?	We recommend that you drain the oil from the component if this has not already been done.
Resample	---	---	?	We recommend an early resample to monitor this condition.
Information Required	---	---	?	NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample.
Check Fluid Source	---	---	?	Confirm the source of the lubricant being utilized for top-up/fill.

HISTORICAL DIAGNOSIS

WEAR

13 Apr 2023 Diag: Kevin Marson

We recommend that you drain the oil from the component if this has not already been done. Confirm the source of the lubricant being utilized for top-up/fill. We recommend an early resample to monitor this condition. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample.Iron ppm levels are severe. The low ferrous density (PQ) index indicates the wear metal levels are due to corrosion. The system cleanliness is acceptable for your target ISO 4406 cleanliness code. The water content is negligible. The system and fluid cleanliness is acceptable. Additive levels indicate the addition of a different brand, or type of oil. The AN level is acceptable for this fluid. The oil is no longer serviceable as a result of the abnormal and/or severe wear.

view report

WEAR

25 Oct 2022 Diag: Bill Quesnel

The oil is near the end of it`s useful service life, recommend schedule an oil change. We recommend an early resample to monitor this condition. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample.Iron ppm levels are abnormal. The low ferrous density (PQ) index indicates the wear metal levels are due to corrosion. The system cleanliness is acceptable for your target ISO 4406 cleanliness code. The water content is negligible. The system and fluid cleanliness is acceptable. Phosphorus ppm levels are abnormally low. The AN level is acceptable for this fluid.

view report

WEAR

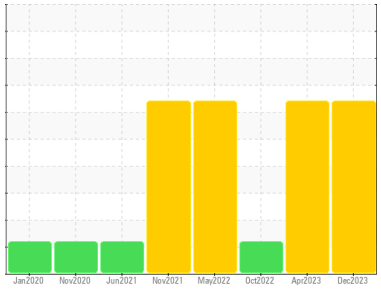
09 May 2022 Diag: Kevin Marson

We recommend that you drain the oil from the component if this has not already been done. Confirm the source of the lubricant being utilized for top-up/fill. We recommend an early resample to monitor this condition. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample.Iron ppm levels are severe. The low ferrous density (PQ) index indicates the wear metal levels are due to corrosion. The system cleanliness is acceptable for your target ISO 4406 cleanliness code. The water content is negligible. The system and fluid cleanliness is acceptable. Additive levels indicate the addition of a different brand, or type of oil. The AN level is acceptable for this fluid. The oil is no longer serviceable as a result of the abnormal and/or severe wear.

view report

OIL ANALYSIS REPORT

Sample Rating Trend



WEAR

Area
Ferndale Phase II SP-13598
Machine Id
T1 V80
Component
Wind Turbine Gearbox
Fluid
MOBIL MOBILGEAR SHC XMP 320 (--- GAL)

DIAGNOSIS

Recommendation

We recommend that you drain the oil from the component if this has not already been done. Confirm the source of the lubricant being utilized for top-up/fill. We recommend an early resample to monitor this condition. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample.

Wear

Iron ppm levels are severe. The low ferrous density (PQ) index indicates the wear metal levels are due to corrosion.

Contamination

The system cleanliness is acceptable for your target ISO 4406 cleanliness code. The water content is negligible. The system and fluid cleanliness is acceptable.

Fluid Condition

Additive levels indicate the addition of a different brand, or type of oil. The AN level is acceptable for this fluid. The oil is no longer serviceable as a result of the abnormal and/or severe wear.

SAMPLE INFORMATION		method	limit/base	current	history1	history2
Sample Number		Client Info		**WC0863468**	WC0783088	WC0305896
Sample Date		Client Info		**07 Dec 2023**	13 Apr 2023	25 Oct 2022
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				**SEVERE**	SEVERE	ABNORMAL

WEAR METALS		method	limit/base	current	history1	history2
PQ		ASTM D8184*	>50	**0**	0	0
Iron	ppm	ASTM D5185(m)	>75	● **104**	● 109	▲ 78
Chromium	ppm	ASTM D5185(m)	>5	**1**	1	<1
Nickel	ppm	ASTM D5185(m)	>10	**0**	<1	<1
Titanium	ppm	ASTM D5185(m)	>10	**0**	0	0
Silver	ppm	ASTM D5185(m)		**0**	0	0
Aluminum	ppm	ASTM D5185(m)	>10	**<1**	<1	0
Lead	ppm	ASTM D5185(m)	>15	**<1**	<1	0
Copper	ppm	ASTM D5185(m)	>5	**<1**	<1	2
Tin	ppm	ASTM D5185(m)	>10	**0**	0	0
Antimony	ppm	ASTM D5185(m)	>5	**0**	0	<1
Vanadium	ppm	ASTM D5185(m)		**0**	0	0
Beryllium	ppm	ASTM D5185(m)		**0**	0	0
Cadmium	ppm	ASTM D5185(m)		**0**	0	0

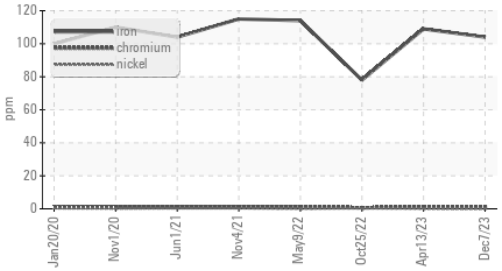
ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185(m)	0	**<1**	1	<1
Barium	ppm	ASTM D5185(m)		**0**	0	0
Molybdenum	ppm	ASTM D5185(m)	0	**1**	2	0
Manganese	ppm	ASTM D5185(m)		**<1**	1	<1
Magnesium	ppm	ASTM D5185(m)		**<1**	0	0
Calcium	ppm	ASTM D5185(m)	0	**1**	0	0
Phosphorus	ppm	ASTM D5185(m)	485	▲ **188**	▲ 218	▲ 276
Zinc	ppm	ASTM D5185(m)	0	**17**	17	9
Sulfur	ppm	ASTM D5185(m)		**6692**	6865	3219
Lithium	ppm	ASTM D5185(m)		**<1**	<1	<1

CONTAMINANTS		method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185(m)	>40	**1**	2	2
Sodium	ppm	ASTM D5185(m)	>10	**6**	7	<1
Potassium	ppm	ASTM D5185(m)	>20	**1**	<1	<1
Water	%	ASTM D6304*	>0.02	**0.004**	0.006	0.004
ppm Water	ppm	ASTM D6304*	>200	**49**	68.2	41.3

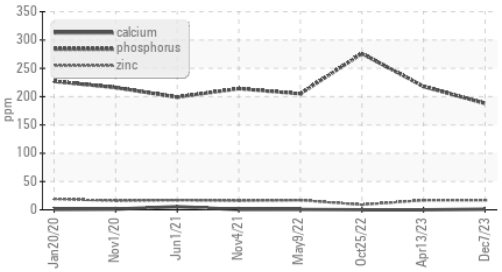
INFRA-RED		method	limit/base	current	history1	history2
Soot %	%	ASTM D7844*		**0**	0	0
Nitration	Abs/cm	ASTM D7624*		**2.0**	1.9	2.4
Sulfation	Abs/.1mm	ASTM D7415*		**27.5**	27.8	22.3

OIL ANALYSIS REPORT

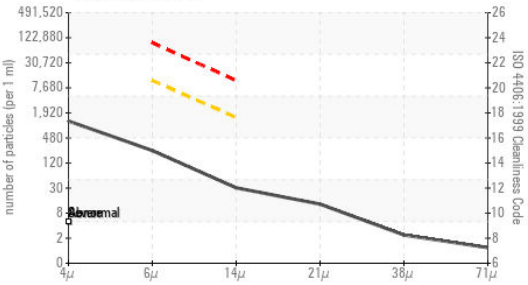
Ferrous Alloys



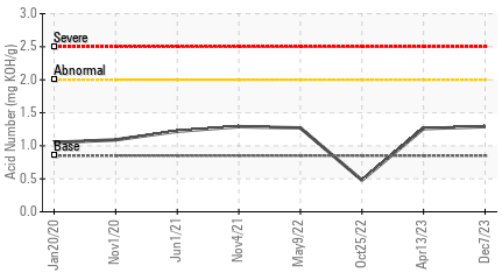
Additives



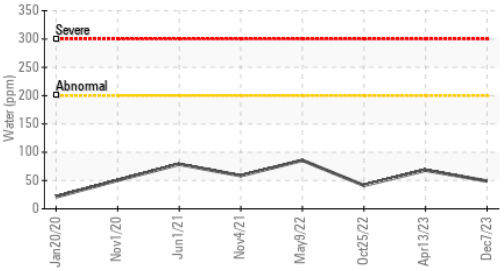
Particle Count



Acid Number



Water (KF)



FLUID CLEANLINESS		method	limit/base	current	history1	history2
Particles >4µm		ASTM D7647		**1073**	3728	1929
Particles >6µm		ASTM D7647	>10000	**211**	1027	397
Particles >14µm		ASTM D7647	>1300	**27**	67	21
Particles >21µm		ASTM D7647	>320	**11**	12	6
Particles >38µm		ASTM D7647	>80	**2**	0	1
Particles >71µm		ASTM D7647	>20	**1**	0	0
Oil Cleanliness		ISO 4406 (c)	>--/20/17	**17/15/12**	19/17/13	18/16/12

FLUID DEGRADATION		method	limit/base	current	history1	history2
Oxidation	Abs/.1mm	ASTM D7414*		**29.1**	29.1	17.8
Acid Number (AN)	mg KOH/g	ASTM D974*	0.85	**1.29**	1.26	0.48

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*	>0.02	**NEG**	NEG	NEG
Free Water	scalar	Visual*		**NEG**	NEG	NEG

FLUID PROPERTIES		method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D7279(m)	335	**324**	325	330
Visc @ 100°C	cSt	ASTM D7279(m)	38.3	**35.2**	35.4	37.3
Viscosity Index (VI)	Scale	ASTM D2270*	164	**154**	154	161

SAMPLE IMAGES	method	limit/base	current	history1	history2
Color					
Bottom					

ISO 17025:2017 Accredited Laboratory

Laboratory : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9 **Vestas American Wind Technology Inc.**
Sample No. : WC0863468 **Recieved** : 12 Jan 2024 1417 NW Everett Street
Lab Number : 02608640 **Diagnosed** : 16 Jan 2024 Portland, OR
Unique Number : 5709726 **Diagnostician** : Kevin Marson US 97209
Test Package : IND 2 (Additional Tests: FT-IR, KF, KV100, PQ, PrtCount, TAN Man, VI) Contact: Nicole Philippi

To discuss this sample report, contact Customer Service at 1-800-268-2131. NiPhi@vestas.com
Test denoted (*) outside scope of accreditation, (m) method modified, (e) tested at external lab. T: (503)327-7683
Validity of results and interpretation are based on the sample and information as supplied. F: (503)327-0247