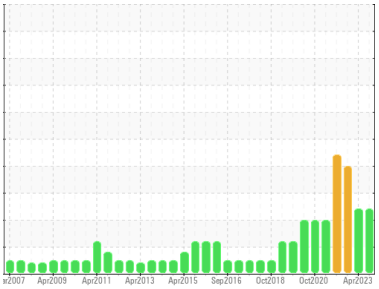
PROBLEM SUMMARY

Sample Rating Trend

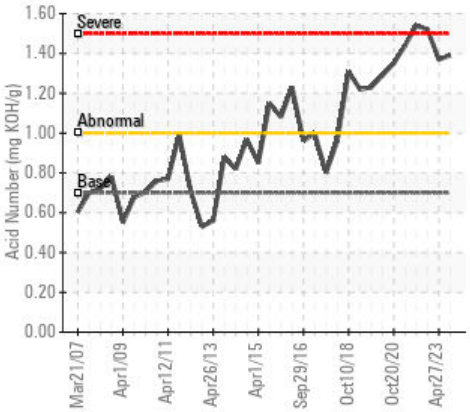


DEGRADATION

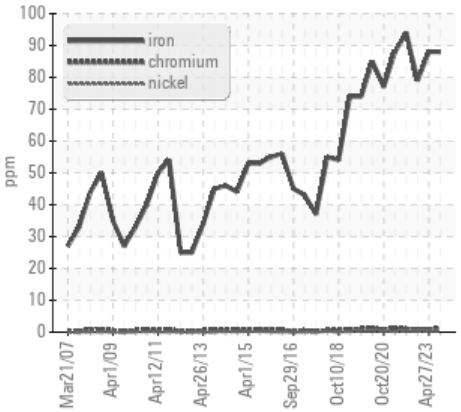
Area
Kingsbridge SP-13584
Machine Id
T3 (S/N 21749)
Component
Wind Turbine Gearbox
Fluid
CHEVRON PINNACLE WM 320 (320 LTR)

COMPONENT CONDITION SUMMARY

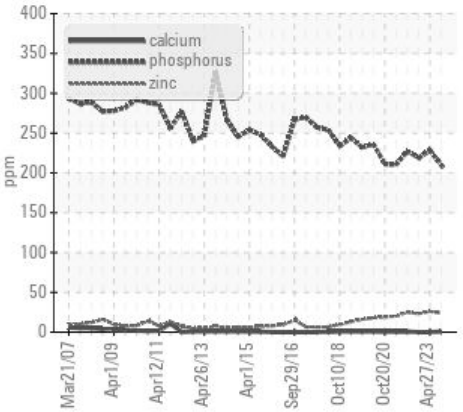
Acid Number



Ferrous Alloys



Additives



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.

PROBLEMATIC TEST RESULTS

Sample Status				ABNORMAL	ABNORMAL	SEVERE
Iron	ppm	ASTM D5185(m)	>75	▲ **88**	▲ 88	▲ 79
Zinc	ppm	ASTM D5185(m)	0	▲ **24**	▲ 26	23
Acid Number (AN)	mg KOH/g	ASTM D974*	0.7	▲ **1.39**	▲ 1.37	⬢ 1.52

Customer Id: VESTAS
Sample No.: WC0783142
Lab Number: 02576946
Test Package: IND 2

To manage this report scan the QR code

To discuss the diagnosis or test data:
Bill Quesnel CLS,OMA II,MLA-III,LLA-I +1 (289)291-4641 x4641
Bill.Quesnel@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.
Check Fluid Source	---	---	?	Confirm the source of the lubricant being utilized for top-up/fill.

HISTORICAL DIAGNOSIS

27 Apr 2023 Diag: Kevin Marson

DEGRADATION

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.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. The AN level is above the recommended limit. Additive levels indicate the addition of a different brand, or type of oil. The oil is no longer serviceable.

view report

04 Oct 2022 Diag: Kevin Marson

DEGRADATION

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.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. Additive levels indicate the addition of a different brand, or type of oil. The high AN level of the oil indicates the presence of oxi-polymerized products. The AN level is much higher than the recommended limit. The oil is no longer serviceable.

view report

30 Sep 2021 Diag: Bill Quesnel

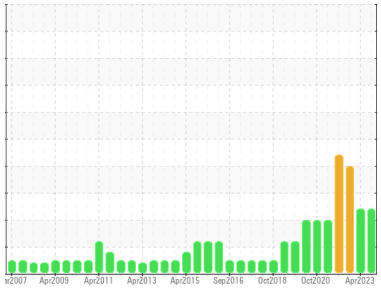
DEGRADATION

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.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. Additive levels indicate the addition of a different brand, or type of oil. The high AN level of the oil indicates the presence of oxi-polymerized products. The AN level is much higher than the recommended limit. The oil is no longer serviceable.

view report

OIL ANALYSIS REPORT

Sample Rating Trend



DEGRADATION

Area
Kingsbridge SP-13584
Machine Id
T3 (S/N 21749)
Component
Wind Turbine Gearbox
Fluid
CHEVRON PINNACLE WM 320 (320 LTR)

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.

Wear

Iron ppm levels are abnormal. 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

The AN level is above the recommended limit. Additive levels indicate the addition of a different brand, or type of oil. The oil is no longer serviceable.

SAMPLE INFORMATION		method	limit/base	current	history1	history2
Sample Number		Client Info		**WC0783142**	WC0783116	WC0305849
Sample Date		Client Info		**26 Jul 2023**	27 Apr 2023	04 Oct 2022
Machine Age	yrs	Client Info		**0**	0	0
Oil Age	yrs	Client Info		**0**	0	0
Oil Changed		Client Info		**N/A**	N/A	N/A
Sample Status				**ABNORMAL**	ABNORMAL	SEVERE

WEAR METALS		method	limit/base	current	history1	history2
PQ		ASTM D8184*	>50	**0**	0	0
Iron	ppm	ASTM D5185(m)	>75	▲ **88**	▲ 88	▲ 79
Chromium	ppm	ASTM D5185(m)	>5	**1**	<1	<1
Nickel	ppm	ASTM D5185(m)	>10	**<1**	<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	**0**	<1	0
Lead	ppm	ASTM D5185(m)	>3	**1**	1	1
Copper	ppm	ASTM D5185(m)	>10	**2**	2	2
Tin	ppm	ASTM D5185(m)	>3	**0**	0	<1
Antimony	ppm	ASTM D5185(m)	>3	**0**	0	0
Vanadium	ppm	ASTM D5185(m)		**0**	0	0
Beryllium	ppm	ASTM D5185(m)		**0**	0	0
Cadmium	ppm	ASTM D5185(m)		**0**	0	0

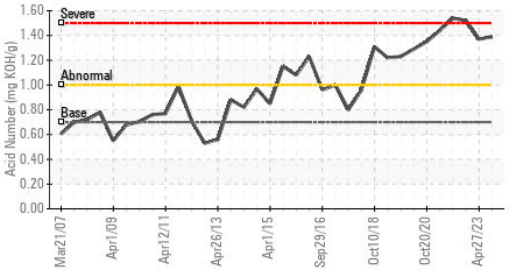
ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185(m)	0	**2**	1	2
Barium	ppm	ASTM D5185(m)	0	**0**	0	0
Molybdenum	ppm	ASTM D5185(m)	0	**0**	0	0
Manganese	ppm	ASTM D5185(m)		**<1**	1	1
Magnesium	ppm	ASTM D5185(m)	0	**<1**	0	0
Calcium	ppm	ASTM D5185(m)	0	**<1**	0	0
Phosphorus	ppm	ASTM D5185(m)	300	**210**	228	219
Zinc	ppm	ASTM D5185(m)	0	▲ **24**	▲ 26	23
Sulfur	ppm	ASTM D5185(m)	8000	**6881**	7099	6901
Lithium	ppm	ASTM D5185(m)		**<1**	<1	<1

CONTAMINANTS		method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185(m)	>10	**1**	<1	1
Sodium	ppm	ASTM D5185(m)	>10	**6**	7	6
Potassium	ppm	ASTM D5185(m)	>20	**1**	3	<1
Water	%	ASTM D6304*	>0.02	**0.011**	0.008	0.007
ppm Water	ppm	ASTM D6304*	>200	**115.2**	84.4	77.2

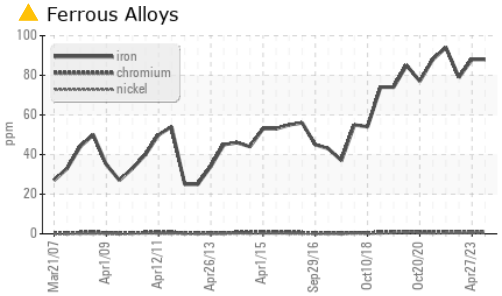
INFRA-RED		method	limit/base	current	history1	history2
Soot %	%	ASTM D7844*		**0**	0	0
Nitration	Abs/cm	ASTM D7624*		**2.2**	2.0	2.3
Sulfation	Abs/.1mm	ASTM D7415*		**28.2**	27.6	18.4

OIL ANALYSIS REPORT

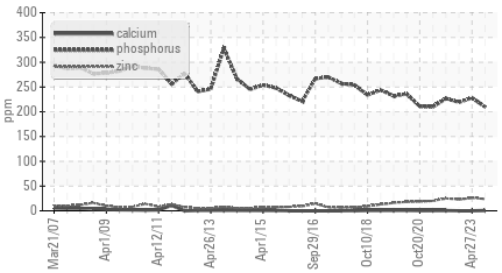
Acid Number



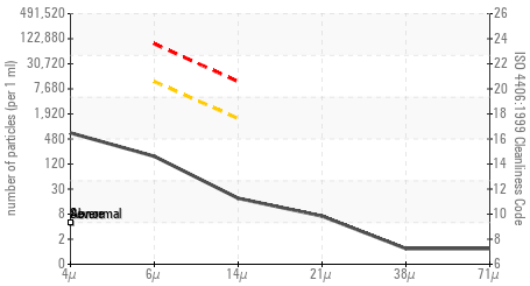
Ferrous Alloys



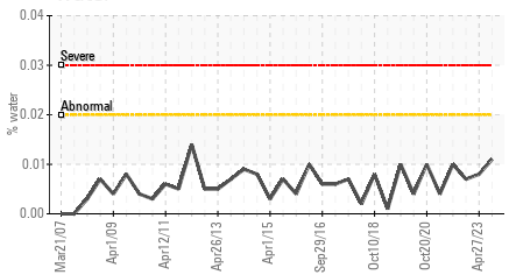
Additives



Particle Count



Water

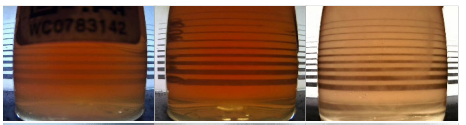


FLUID CLEANLINESS		method	limit/base	current	history1	history2
Particles >4µm		ASTM D7647		**589**	7059	515
Particles >6µm		ASTM D7647	>10000	**162**	434	129
Particles >14µm		ASTM D7647	>1300	**16**	18	11
Particles >21µm		ASTM D7647	>320	**6**	5	2
Particles >38µm		ASTM D7647	>80	**1**	0	0
Particles >71µm		ASTM D7647	>20	**1**	0	0
Oil Cleanliness		ISO 4406 (c)	>--/20/17	**16/15/11**	20/16/11	16/14/11

FLUID DEGRADATION		method	limit/base	current	history1	history2
Oxidation	Abs/.1mm	ASTM D7414*		**29.3**	29.1	13.6
Acid Number (AN)	mg KOH/g	ASTM D974*	0.7	▲ **1.39**	▲ 1.37	⬢ 1.52

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)	319	**328**	330	331
Visc @ 100°C	cSt	ASTM D7279(m)	35.4	**35.6**	35.8	36.0
Viscosity Index (VI)	Scale	ASTM D2270*	156	**154**	154	155

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. : WC0783142 **Received** : 18 Aug 2023 1417 NW Everett Street
Lab Number : 02576946 **Diagnosed** : 23 Aug 2023 Portland, OR
Unique Number : 5630006 **Diagnostician** : Bill Quesnel US 97209
Test Package : IND 2 (Additional Tests: FT-IR, KF, KV100, PQ, 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